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

Table of Contents

Mission Statement ............................................................ 3
Philosophy ........................................................................... 4
2004 New Jersey Core Curriculum Content Standards ..... 5
Program Description ............................................................ 6
Calculator Philosophy ......................................................... 7
Grade K Curriculum ............................................................ 8
Grade 1 Curriculum ............................................................ 29
Grade 2 Curriculum ............................................................ 53
Grade 3 Curriculum ............................................................ 87
Grade 4 Curriculum ............................................................ 117
Grade 5 Curriculum ............................................................ 152
Grade 6 Curriculum ............................................................ 198
Algebra IA Curriculum ......................................................... 219
Grade 3 Gifted and Talented Curriculum ......................... 236
Grade 4 Gifted and Talented Curriculum ......................... 261
Grade 5 Gifted and Talented Curriculum ......................... 279
Supplemental Resources ...................................................... 301
Addendum Grades K-2 ......................................................... 316
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
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:

<table>
<thead>
<tr>
<th>Level</th>
<th>Textbook</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grades K-6</td>
<td>Everyday Mathematics</td>
</tr>
<tr>
<td>Algebra IA</td>
<td>Discovering Algebra</td>
</tr>
</tbody>
</table>
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.
## Kindergarten Math
### Pacing Guide

**SEPTEMBER**
- **Unit 1:** Activities 1-1 thru 1-10; 1-12, 1-14
- **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 prerequisite); 3-1

**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

**OCTOBER**
- **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 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
### 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?

<table>
<thead>
<tr>
<th>Knowledge/Skills/Understandings</th>
<th>Assessments</th>
<th>Learning Experiences</th>
<th>Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. Number Sense</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Use real life experiences, physical materials, and technology to construct meaning for numbers.</td>
<td>Observation of students exploration with manipulatives Oral assessment Mid Year/End of Year Assessments &quot;Look and Find&quot; (Numbers 1 -10) Egg-Carton Mathematics</td>
<td>Listen and Count</td>
<td><em>Everyday Math: Teacher's Guide</em></td>
</tr>
<tr>
<td><em>Demonstrates understanding of one-one correspondence.</em> (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)</td>
<td>Mid-Year and Final: One-to-One Correspondence to 20 Teacher number cards Act. Making Towers Grow and Shrink Creations Unifix Cubes Digi-Blocks</td>
<td></td>
<td><em>Everyday Math: Teacher's Guide</em></td>
</tr>
<tr>
<td><em>Verbally counts 20 or more objects in a random arrangement.</em></td>
<td>Final: Subitizing with Finger Patterns Finger Counting Say-It Fast Cards High Roller game</td>
<td></td>
<td><em>Everyday Math: Teacher's Guide</em></td>
</tr>
<tr>
<td><em>Identifies small numbers without counting.</em></td>
<td></td>
<td></td>
<td><em>Developing Number Concepts: Counting, Comparing, and Patterns, Kathy Richardson</em></td>
</tr>
</tbody>
</table>
**Flemington-Raritan School District**  
**Mathematics Curriculum**

<table>
<thead>
<tr>
<th><strong>Task</strong></th>
<th><strong>Mid-Year and Final:</strong></th>
<th><strong>Interrupted skip counts</strong></th>
<th><strong>Everyday Math: Teacher's Guide</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Performs verbal counting to 100.</em></td>
<td>Forward counting 1...to 100</td>
<td>Listen and Do</td>
<td><strong>Everyday Math: Teacher's Guide</strong></td>
</tr>
<tr>
<td><em>Count with calculator using the repeat key.</em></td>
<td>Monitor correct use of calculator</td>
<td>Counting and</td>
<td><strong>Everyday Math: Teacher's Guide</strong></td>
</tr>
<tr>
<td><em>Expose to ordinal numbers and terminology</em></td>
<td>Ordinal Numbers: Standing in Line</td>
<td><strong>Everyday Math: Teacher's Guide</strong></td>
<td></td>
</tr>
</tbody>
</table>

**Everyday Math: Teacher's Guide**

### (Preschool)

<table>
<thead>
<tr>
<th><strong>Task</strong></th>
<th><strong>Mid-Year and Final:</strong></th>
<th><strong>EM Activity:</strong></th>
<th><strong>Everyday Math: Teacher's Guide</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Reads any number, 30 or less.</em></td>
<td>Numeral Identification to 30</td>
<td>Monthly Calendar</td>
<td><strong>Everyday Math: Teacher's Guide</strong></td>
</tr>
<tr>
<td><em>Demonstrate an understanding of place value concepts.</em></td>
<td></td>
<td>Number Board</td>
<td><strong>Everyday Math: Teacher's Guide</strong></td>
</tr>
<tr>
<td><em>Recognizes and names some written numerals.</em></td>
<td></td>
<td>Teen Partner Game</td>
<td><strong>Everyday Math: Teacher's Guide</strong></td>
</tr>
<tr>
<td><strong>(Preschool)</strong></td>
<td></td>
<td>Monster Squeeze Game</td>
<td><strong>Everyday Math: Teacher's Guide</strong></td>
</tr>
<tr>
<td><em>Understands teen numbers in terms of 10's and 1's.</em></td>
<td></td>
<td>EM Game: Top It</td>
<td><strong>Everyday Math: Teacher's Guide</strong></td>
</tr>
<tr>
<td><strong>Preschool</strong></td>
<td></td>
<td>Teen Number Spin</td>
<td><strong>Everyday Math: Teacher's Guide</strong></td>
</tr>
</tbody>
</table>

- **Making a concrete number count collection**
- **Student participation in whole class discussion**
Flemington-Raritan School District
Mathematics Curriculum

*Writes numerals 0 -10.
*Reads and writes numbers, 100 or less.

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

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
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.

Everyday Math: Teacher’s Guide

*Introduce concept of zero

Oral discussion

Everyday Math: Teacher’s Guide
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)

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

- Demonstrates an understanding of simple fractions. (1/2, 1/4)

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

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)

- Recognizes and names penny, nickel, and dime.
- Knows the value of a penny, nickel and dime.
- Recognizes a quarter.

Teacher Observation  
Counters, "real" objects  

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  

Informally introduce the cents symbol as a label  

Play Store  

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

### Flemington-Raritan School District Mathematics Curriculum

<table>
<thead>
<tr>
<th>Activity</th>
<th>Description</th>
<th>Resource</th>
</tr>
</thead>
<tbody>
<tr>
<td>*Introduce the one-dollar bill</td>
<td>Observation of students during play</td>
<td><em>Everyday Math: Teacher's Guide</em></td>
</tr>
<tr>
<td>*Introduce the ten dollar bill</td>
<td>Observation of students during play</td>
<td><em>Everyday Math: Teacher's Guide</em></td>
</tr>
<tr>
<td><strong>5. Compare and order whole numbers.</strong></td>
<td>Observation of student during play</td>
<td><em>Everyday Math: Teacher's Guide</em></td>
</tr>
<tr>
<td><em>Compares numbers in different contexts (e.g., using words such as more and less). (Preschool)</em></td>
<td>Teacher Observation</td>
<td><em>Everyday Math: Teacher's Guide</em></td>
</tr>
<tr>
<td>*Sequence low to high.</td>
<td>Mid-Year and Final: Ordering Numerals, Final: Number After and Number Before</td>
<td><em>Everyday Math: Teacher's Guide</em></td>
</tr>
</tbody>
</table>

*Note: Everyday Math*
### B. Numerical Operations

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

<table>
<thead>
<tr>
<th>Student-teacher interviews</th>
<th>Number stories throughout the year</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Joining, separating and comparing.</strong></td>
<td>Provide opportunities for experiences with multiple number stories throughout the year, develop meanings for operations and problem solving skills</td>
</tr>
<tr>
<td>Oral / Slate assessment</td>
<td>Disappearing Train</td>
</tr>
<tr>
<td></td>
<td>Plus or Minus game</td>
</tr>
<tr>
<td></td>
<td>&quot;What Number Am I thinking Of?&quot;</td>
</tr>
<tr>
<td></td>
<td>High Roller Game</td>
</tr>
</tbody>
</table>

   | 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) | Number line Mathematics |
   | | Change to More number stories |
   | | Dice Addition |

   | Teacher Observation | Everyday Math: Teacher's Guide |
   | Subtract 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) | Everyday Math: Teacher's Guide |
   | Oral communication with teacher | Change to Less number stories |

   | Teacher Observation | Everyday Math: Teacher's Guide |
   | *Understands equivalent expression as two or more different expressions of the same number.* | Dominoes Name Collections |
   | | Bead String Name Collection |
   | | Craft Stick Name Collection |

Flemington-Raritan School District
Mathematics Curriculum

*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?

*Participates in solving oral number stories.

Oral assessment
Student sharing of own stories and solutions

Number Stories throughout the Year

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

Divide Groups into Half Groups use manipulatives

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.

High Roller
Top It

*Explore counting one more or one less)

Oral / Slate Assessment
One More or One less

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

Everyday Math: Teacher's Guide

Everyday Math: Teacher's Guide

Everyday Math: Teacher's Guide

Everyday Math: Teacher's Guide
3. Explore a variety of strategies for estimating quantities.

*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)

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

<table>
<thead>
<tr>
<th>Teacher Observation</th>
<th>Estimation Activities</th>
<th>Explore ways to develop strategies for estimating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher Observation</td>
<td>Estimation Activities</td>
<td><em>Everyday Math: Teacher's Guide</em></td>
</tr>
</tbody>
</table>

Everyday Math: Teacher's Guide
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?

<table>
<thead>
<tr>
<th>Knowledge/Skills/Understandings</th>
<th>Assessments</th>
<th>Learning Experiences</th>
<th>Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Identify and describe spatial relationships among objects in space and their relative shapes and sizes.</strong></td>
<td>Oral Discussions</td>
<td>Pattern Block Puzzles</td>
<td><em>Everyday Math: Teacher's Guide</em></td>
</tr>
<tr>
<td><em>Use positional words in a functional way.</em> <em>(ex. Put the red block on top of the cabinet.)</em> <em>(list words)</em> <em>(Preschool)</em></td>
<td>Teacher Observation</td>
<td>Classroom activities</td>
<td>&quot;Do the Hokey Pokey&quot;</td>
</tr>
</tbody>
</table>

| **2. Use concrete objects and drawings to identify, classify and describe standard three-dimensional and two-dimensional shapes.** | Observation of student while interacting with manipulatives | Using A Pattern Block Template | *Everyday Math: Teacher's Guide* |
| *vertex, edge, face, side* | | Shapes By Feel | |
| *3-D figures - cube, rectangular prism, sphere, cone cylinder, and pyramid* | | Compare shapes | "I Spy" |
| *2-D figures - square, rectangle, circle, triangle* | | Comparing four-sided polygon | |
| *Relationships between three- and two-dimensional shapes (e.g., the face of a 3D shape is a 2D shape).* | | | |

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

Teacher Observation | Name shapes in the environment | Clay |
Teacher Observation | 3-D Blocks |
**Flemington-Raritan School District**

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

<table>
<thead>
<tr>
<th>Mid-Year and Final:</th>
<th>Shape Designs</th>
<th>Everyday Math: Teacher's Guide</th>
</tr>
</thead>
<tbody>
<tr>
<td>Names shapes</td>
<td>Geoboard Shapes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Feely Box Shapes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>I Spy</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Find the Block</td>
<td></td>
</tr>
</tbody>
</table>

3. Describe and identify and create instances of symmetry.

<table>
<thead>
<tr>
<th>Observation of student exploration while interacting with manipulatives</th>
<th>Symmetry with Paints</th>
<th>Everyday Math: Teacher's Guide</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whole class discussion</td>
<td>Symmetry in Nature</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Symmetry Fold and Cut Projects</td>
<td></td>
</tr>
</tbody>
</table>

*Has experiences with basic geometry shapes and symmetry concepts*

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

*Identifies, describes and uses pattern blocks.

<table>
<thead>
<tr>
<th>Teacher Observation</th>
<th>Using a Pattern Block</th>
<th>Everyday Math: Teacher's Guide</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Template</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Covering Shapes</td>
<td></td>
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<tr>
<td></td>
<td>Patterns All Around</td>
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<tr>
<td></td>
<td>Pattern Block Puzzles</td>
<td></td>
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<td></td>
<td>Making Pattern Block</td>
<td></td>
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<tr>
<td></td>
<td>Pictures</td>
<td></td>
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<tr>
<td></td>
<td>Covering Shapes</td>
<td></td>
</tr>
</tbody>
</table>

B. Transforming Shapes

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

<table>
<thead>
<tr>
<th>Observation of student creations</th>
<th>Shape Designs</th>
<th>Everyday Math: Teacher's Guide</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pattern Blocks</td>
<td></td>
</tr>
</tbody>
</table>
Flemington-Raritan School District
Mathematics Curriculum

*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.

| 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)

*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.

*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 | Everyday Math: Teacher's Guide |
2. Recognize the need for a uniform unit of measure.

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

Teacher observation

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

*Exploring volume and weight.

Teacher observation

Sand and Water Play
Rocker Balance
Things that Float or Sink

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)

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

Whole class discussion

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

How Big is a Foot?, Rolf Myller
Inch by Inch, Leo Leonni
| 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                                                           |  |  |
|                                                                                   |  |  |
| - Building and Measuring in the Block Corner                                      | Teacher Observation | Comparing Body Heights to Objects |
| - Oral assessment                                                                 | Oral assessment    | Make an Hour Hand Clock           |
| - Observation of student participation in activity                                | Observation of student participation in activity | Beating out Time How Long is a Minute? |
Flemington-Raritan School District
Mathematics Curriculum

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?

<table>
<thead>
<tr>
<th>Knowledge/Skills/Understandings</th>
<th>Assessments</th>
<th>Learning Experiences</th>
<th>Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. Patterns</strong></td>
<td></td>
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</tr>
<tr>
<td>1. Recognize, describe, extend and create pattern.</td>
<td>Observation of students while exploring with manipulatives or models</td>
<td>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</td>
<td><em>Everyday Math: Teacher's Guide</em></td>
</tr>
</tbody>
</table>

| **B. Functions and Relationships** |             |                     |           |
| 1. Use concrete and pictorial models of function machines to explore the concept of a function. | 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 | *Everyday Math: Teacher's Guide*          |
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)

D. Procedures

Comparing numbers in different contexts. (e.g., using words such as more and less) (Preschool)
   * Introduce the Number-Model format

Teacher /student discussion; teacher observation
Responsive Classroom, morning message, calendar activities

Student-teacher interview
Calendar activities, counters and other manipulatives

Oral / Slate assessment
Explore 3 + 4 = ___ and simple open sentences

*Introduce the Number-Model format

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:**
1. How can classifying help me in organizing data to solve problems?
2. How can statistics help us to understand real world situations?
3. 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
   - Attendance Routine
   - Recording Daily Temperature
   - Everyday Math: Teacher's Guide

2. **Data generated from chance devices, such as spinners and dice.**
   - Observation of students during play
   - Spiders, Dice games
   - Calendar activities
   - Everyday Math: Teacher's Guide

3. **Read, interpret, construct and analyze displays of data.**
   - *Pictures, tally chart, pictograph, bar graph, Venn Diagram*
   - Smallest to largest, most frequent (mode)
   - Observation of students during play
   - Graph sums of dice throws
   - Everyday Math: Teacher's Guide

4. **Arrange pictures of events in temporal order.**
   - (Preschool)
   - Teacher Observation
   - Weather Observation Routine
   - Everyday Math: Teacher's Guide

5. **Read concrete, pictorial, and simple bar graphs.**
   - Final: Read a graph
   - Birthday Bar Graph
   - Everyday Math: Teacher's Guide
### B. Probability

2. Provide probability of specific outcomes.

*Everyday Math: Teacher's Guide*

<table>
<thead>
<tr>
<th>Teacher Observation</th>
<th>Counters, &quot;real&quot; counting items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Graphing Sums of Dice Throws</td>
<td></td>
</tr>
</tbody>
</table>

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

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

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

| Final: Attribute Block Sorting | Read My Mind Sorting Boxes | Attribute Block guide |
| 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)

<table>
<thead>
<tr>
<th>Teacher observation</th>
<th>Rug and classroom group activities</th>
<th>Classroom chime</th>
</tr>
</thead>
</table>
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.

*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)

Teacher observation Various whole group, small group and partner classroom activities

B. Communication

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

Teacher observation What's My Rule? Dismantling the Monthly Calendar

Everyday Math: Teacher's Guide

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

Teacher observation Birthday Graph

Teacher supplement

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

Everyday Math: Teacher’s Guide Teacher supplement

Everyday Math: Teacher’s Guide
<table>
<thead>
<tr>
<th>Activity</th>
<th>Teacher Observation</th>
<th>Model Appropriate Math Vocabulary</th>
<th>Everyday Math: Teacher’s Guide</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Use connections among mathematical ideas to explain concepts.</td>
<td>Student-teacher interview</td>
<td>2-D and 3-D Objects</td>
<td>The Tortoise and the Hare</td>
</tr>
<tr>
<td>3. Recognize that mathematics is used in a variety of contexts outside of mathematics.</td>
<td>Teacher observation</td>
<td>Noticing Numbers in the environment</td>
<td></td>
</tr>
<tr>
<td>D. Reasoning</td>
<td>Observation of partner play</td>
<td>&quot;Feely&quot; Bag or Box Partners</td>
<td></td>
</tr>
<tr>
<td>2. Use reasoning to support their mathematical conclusions and problem solutions.</td>
<td>Teacher observation</td>
<td>Engage student in play that facilitates simple problem solving</td>
<td></td>
</tr>
<tr>
<td>*Use emergent mathematical knowledge as a problem-solving tool. (Preschool)</td>
<td>Teacher observation</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### E. Representations

1. Create and use representations to organize, record, and communicate mathematical ideas.
   - Concrete representations
   - Pictorial representations
   - Symbolic representations

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

   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*

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

   Teacher observation / Student responses

   Classroom symbols, school symbols, bathroom symbols, street light

   *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

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

<table>
<thead>
<tr>
<th>Knowledge/Skills/Understandings</th>
<th>Assessments</th>
<th>Learning Experiences</th>
<th>Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Use real-life experiences, physical materials, and technology to construct meanings for numbers. <em>Whole numbers through hundreds</em> <em>Ordinals</em> <em>Proper fractions (denominators of 2, 3, 4, 8, 10)</em></td>
<td>Oral / Slate Assessment Unit Assessments Do Now Teacher Observation Discussion Open Ended Writing Tasks Recognizing Student Achievement sections in Everyday Math 3</td>
<td>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</td>
<td><em>Everyday Mathematics, Lesson 1.2, 5.6, 8.3, 10.7</em></td>
</tr>
</tbody>
</table>

*Count by 2’s to 100; Count by 5’s to 100*
Flemington-Raritan School District
Mathematics Curriculum

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

*Wants any number 100 or less

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

*Practice counting on a number line

*Write and count tallies

*Find equivalent names for a number

*Explore parts and total relationships

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

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

Everyday Mathematics, Lesson 6.6, 9.2

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

Everyday Mathematics, Lesson 1.7, 2.9

Everyday Mathematics, Lesson 6.2

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

Everday 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

Everyday Mathematics, Lesson 3.2, 3.3, 5.2, 6.5, 9.1
Investigate number patterns for counting by 1s and 10s
May explore patterns using a calculator to generate numbers

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

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

Everyday Mathematics, Lesson 2.9, 2.10, 3.11, 3.12

* 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

5. Compare and order whole numbers.

*Order and compare numbers to 22

*Compare numbers using < and >

*Make the largest and smallest numbers using number cards

*Compare fractions less than 1

*Compare prices

Everyday Mathematics, Lesson 10.3
Teacher supplement

Everyday Mathematics, Lesson 1.6

Everyday Mathematics, Lesson 5.3, 5.6, 5.9

Everyday Mathematics, Lesson 9.1

Everyday Mathematics, Lesson 9.7

Everyday Mathematics, Lesson 10.4
By the end of first grade (MP4), 80% of Flemington-Raritan first graders will have basic fact mastery of sums to 10.

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

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

- Know addition facts for +1, +0 doubles and sums of 10
- Find complements of 10
- Learn and know addition facts

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

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

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
Everyday Mathematics, Lesson 5.11

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

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

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

*solve simple addition and subtraction number stories

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

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

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

*Explore and solve addition of 2-digit numbers

* Solve 2-digit addition and subtraction problems

Everyday Mathematics, Lesson 6.3, 6.4, 6.7

Everyday Mathematics, Lesson 9.3

Everyday Mathematics, activities, ongoing throughout the year

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

Everyday Mathematics, Lesson 3.6

Everyday Mathematics, Lesson 3.8, 3.9, 6.8

Teacher supplement as needed

Everyday Mathematics, Lesson 5.5, 9.4 10.3, 10.4

Everyday Mathematics, Lesson 9.4, 10.3, 10.4
8. Understand and use the inverse relationship between addition and subtraction.

* Find simple sums and missing addends

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

* Complete simple "Frames and Arrows" diagrams

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.

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

<table>
<thead>
<tr>
<th>Knowledge/Skills/Understandings</th>
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<th>Learning Experiences</th>
<th>Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Geometric Properties</td>
<td></td>
<td></td>
<td>Make appropriate connections to Science Curriculum</td>
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<tr>
<td></td>
<td>Oral / Slate Assessment</td>
<td>Pattern Blocks</td>
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<tr>
<td></td>
<td>Unit Assessments</td>
<td>3D shapes</td>
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<td>Do Now</td>
<td>Geometric template</td>
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<td>Teacher Observation</td>
<td>Geoboards</td>
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<td></td>
<td>Discussion</td>
<td>Polygons</td>
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<td>Open Ended Writing</td>
<td>EM Activities</td>
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<td>Tasks</td>
<td>EM Games</td>
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<td>Recognizing Student Achievement sections in Everyday Math 3</td>
<td>Attribute blocks</td>
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<td>Mira/Reflection Mirrors</td>
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<td>Fraction Pieces</td>
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<td>Rulers/Master Rulers</td>
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<td>Yardstick/Meter stick</td>
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<td>Inchworms</td>
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<td>Judy clocks</td>
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<td>Stopwatch</td>
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<td>Thermometer</td>
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<td>Scales/Pan balance/Weights</td>
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<td></td>
<td>Create 3-D objects</td>
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<td>Anglegs</td>
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</tbody>
</table>

* Sort and identify objects by attributes

*Everyday Mathematics*, activities ongoing Unit 7
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

* Identify three dimensional shapes and know their characteristics

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

* Identify symmetrical figures

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

B. Transforming Shapes

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

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

C. Coordinate Geometry

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

* Identify three dimensional shapes and know their characteristics

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

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

Face symmetry project

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

Everyday Mathematics, Lesson 7.2, 7.3

Everyday Mathematics, Lesson 3.4, 7.2, 7.3

See map skills unit in Social Studies Curriculum
D. Units of Measurement

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

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

* Use standard units for measuring length (centimeters/inches)
  *Centimeter measures (Grade 2 secure)

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

* Measure objects to the nearest centimeter

*Introducing the meter
Flemington-Raritan School District
Mathematics Curriculum

*Measuring to the nearest inch and half inch

*Introducing the yard

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

*Explore area by counting units

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

*Telling time on the quarter hour

*Telling time to five minutes

*Understand digital notation for time

*Introduce the use of the second hand for timing tasks

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

Everyday Mathematics, Lesson 4.2

Everyday Mathematics, Lesson 4.6

Everyday Mathematics, Lesson 5.4

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

Everyday Mathematics, Lesson 4.8

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

Everyday Mathematics, Lesson 6.10

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

*Measuring and drawing line segments

Teacher supplement

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?

<table>
<thead>
<tr>
<th>Knowledge/Skills/Understandings</th>
<th>Assessments</th>
<th>Learning Experiences</th>
<th>Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Patterns</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Unit Assessments</td>
<td>Attribute blocks</td>
<td>* Every day Mathematics, Lesson 3.1, 3.4, 3.5, 7.3</td>
</tr>
<tr>
<td></td>
<td>Do Now</td>
<td>Craft sticks</td>
<td>Website resources</td>
</tr>
<tr>
<td></td>
<td>Teacher Observation</td>
<td>Dominoes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Discussion</td>
<td>EDM Activities</td>
<td></td>
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<tr>
<td></td>
<td>Open Ended Writing</td>
<td>EDM Games</td>
<td></td>
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<tr>
<td></td>
<td>Tasks</td>
<td>Number girds</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Recognizing Student Achievement sections in Everyday Math 3</td>
<td>Frames and Arrows</td>
<td></td>
</tr>
</tbody>
</table>

*Count by 2's, 5's and 10's to 100

* Identify and complete patterns

* Identify and use patterns on a number grid

Everyday Mathematics, Lesson 2.1, 2.8, 2.9, 3.2, 3.3, 3.12

Everyday Mathematics, Lesson 3.1, 3.4, 3.13, 7.3
National Library of Virtual Manipulatives website activities

Everyday Mathematics, Lesson 3.3
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

C. Modeling

1. Recognize and describe changes over time.
   * Interpreting pictographs, bar graphs

2. Construct and solve simple open sentences involving addition or subtraction.
   * Find simple sums and missing addends

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

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

Everyday Mathematics Lesson 6.2 - 6.5
   Elementary School Mathematics with Pizzazz, Creative Publications
D. Procedures

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

* Zero Identity: knows +0 addition facts

* Commutative: identify simple Turn-around addition facts

* Explore associative property when adding three numbers

  * Introduce, understand and apply symbols <, > =

  * Write number model stories using more than or less than

Teacher supplement

* Elementary School Mathematics with Pizzazz, Creative Publications

* Everyday Mathematics, Lesson 5.11

* Everyday Mathematics, Lesson 5.10

* Activities, ongoing throughout the year

* Everyday Mathematics, Lesson 5.3, 5.6

* 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?

<table>
<thead>
<tr>
<th>Knowledge/Skills/Understandings</th>
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<th>Learning Experiences</th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>A. Data Analysis</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| 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 | Navigations in Data Analysis, Probability in Grades K-2, NCTM, selected activities  
*Everyday Mathematics, Lesson 1.7, 1.12, 2.5, 3.13, 6.12, 10.1* |
| 2. Read, interpret, construct, and analyze displays of data. *Pictures, tally chart, pictograph, bar graph, Venn diagram.* | 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 | *Everyday Mathematics, Lesson 1.12, 3.13, 4.7, 6.12, 7.4, 7.5, 10.1*  
Teacher supplement  
Website resources | *Everyday Mathematics, Lesson 3.13, 4.7, 10.1* |
*Smallest to largest, most frequent (mode)

*Introduce statistical landmarks range and middle value

B. Probability

1. Use chance devices like spinners and dice to explore concepts of probability.
   * certain, impossible
   * more likely, less likely, equally likely

2. Provide probability of specific outcomes.

C. Discrete Mathematics - Systematic Listing and Counting

1. Sort and classify objects according to attributes.

2. Generate all possibilities in simple counting situations (e.g., all outfits involving two shirts and three pants)
D. Discrete Mathematics - Vertex-Edge Graphs and Algorithms

1. Follow simple sets of directions.

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

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

<table>
<thead>
<tr>
<th>Knowledge/Skills/Understandings</th>
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<th>Learning Experiences</th>
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</tr>
</thead>
<tbody>
<tr>
<td>A. Problem Solving</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| 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 | *Everyday Mathematics*, Activities throughout the year  
*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 |
| 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 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.

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

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

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

Everyday Mathematics, Lesson 8.2
Teacher supplement

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

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

Best of Math I and II, Exemplars CD

Everyday Mathematics, Lesson 7.2
C. Connections
1. Recognize recurring themes across mathematical domains.

2. Use connections among mathematical ideas to explain concepts.

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

4. Apply mathematics in practical situations in other disciplines.

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

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

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

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

Everyday Mathematics, Lesson 1.2, 1.9
Teacher supplement

Project: 5 Apple Math
Project 2 Amaryllis Plant

Project 1 Geometric Gift
Wrap and Greeting Cards

Science Curriculum, Social Studies Curriculum

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

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

Everyday Mathematics, Lesson 7.4
Teacher supplement
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
   * Pictorial representations
   * Symbolic representations

F. Technology

4. Use calculators as problem solving tools.

Teacher supplement
Create student friendly rubric
Website resources

*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

*Everyday Mathematics*, Lesson 2.4, 3.10, 8.1, 8.2
Texas Instruments resources
### Second Grade Math Pacing Guide

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

**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)

<table>
<thead>
<tr>
<th>Assessments</th>
<th>Learning Experiences</th>
<th>Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit Assessments</td>
<td>Direct Instruction</td>
<td>NJ Mathematics Curriculum Framework grades K-2, selected activities</td>
</tr>
<tr>
<td>Do Now</td>
<td>Collaborative and Cooperative Learning</td>
<td></td>
</tr>
<tr>
<td>Teacher Observation</td>
<td>Open Ended Writing Tasks</td>
<td></td>
</tr>
<tr>
<td>Discussion</td>
<td>EM Games</td>
<td></td>
</tr>
<tr>
<td>Open Ended Writing Tasks</td>
<td>Digi-blocks</td>
<td></td>
</tr>
<tr>
<td>Recognizing Student Achievement sections in Everyday Math 3</td>
<td>Base Ten Blocks</td>
<td></td>
</tr>
<tr>
<td>Calendar skills</td>
<td></td>
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</tr>
</tbody>
</table>

***Ordinals (First grade secure)*

**Whole numbers through hundreds**

**Proper fractions (denominators of 2, 3, 4, 8, 10)**

**Count by 2's, 5's and 10's through hundreds**

**Make tallies and give the total**

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Flemington-Raritan School District

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Flemington-Raritan School District Mathematica Curriculum
Mathematics Curriculum

| * Find equivalent names for numbers | Fact Families | Everyday Mathematics Lessons |
| * Name collection boxes | Funny Numbers | 1.9 1.13, 2.9, |
| | Roman Numerals | |
| | Ten-Frames | |
| *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 | Auntie Pasta's Fraction Game |
| | Everyday Mathematics, Lessons 8.1 - 8.6 |
| | Teacher supplement |
| | Website games and resources |

| * Give the fraction name for the shaded part of a region or collection (Denominators 2, 3, 4, 8, 10) | |
| | Everyday Mathematics, Lessons 8.4, 8.5 |
| | EM resource for fraction circles, Math Masters, page 144 |

*Understand fractions as names for equal parts of a region or set
*Recognize equivalent fraction names
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Mathematics Curriculum

*Compare fractions

*Solve number stories involving fractions

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

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

* Identify place value for ones, tens and hundreds.

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

* Solve number grid puzzles

Everyday Mathematics, Lesson 8.5
Fraction Kit, Marilyn Burns

Everyday Mathematics, Lesson 8.7

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

Everyday Mathematics, Lessons 1.9, 1.12, 1.13.

Quizmo Bingo

Quizmo Bingo
Teacher supplement
Website resources

Everyday Mathematics, Lessons 1.8, 7.2, 10.6, 11.2
3. Understand that numbers have a variety of uses.

4. Count and perform simple computations with coins.
   * Amounts up to $1.00 using cent notation.

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

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

   * Make change up to $1.00.
   * Making change from $10.00

   * Know exchange values of US coins.

   Money Bags Game
   Allowance Game

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

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

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

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

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.

*Use a calculator to compute money amounts.

*Solve money stories involving change.

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

Everyday Mathematics, Lessons 3.2, 10.1, 10.4
Teacher supplement

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

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

Big Book, More or Less
Everyday Mathematics Lessons 1.11
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. Economopoulus & 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
*Solve stories about multiplication of equal groups

* Solve equal grouping and equal sharing division problems

*Solve simple multiplication and division number stories.

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.

Everyday Mathematics, Lesson 6.8, 6.9, 6.10, 11.4
Teacher supplement
Sea Squares, Joy N. Hulme
EM resource: multiplication diagram

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

Everyday Mathematics, Lesson 11.4, 11.5

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 Folk tale, 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**

* **Know addition facts, sums to 18.**

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

* **Know subtraction facts.**

* **Construct fact families for addition and subtraction**

* **Practice doubling and halving**

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

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

* **Solve Frames and Arrow problems having two rules**

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

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

* **Everyday Mathematics**, Lesson 2.5
  Anno's Magic Seeds,
  Two of Everything: A Chinese Folktale, Lilly Toy Hong

* **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

* **Everyday Mathematics**, Lesson 2.6, 2.7, 2.10

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

* **Everyday Mathematics**, Lesson 2.2, 2.10, 3.6, 4.1

* **Everyday Mathematics**, Lesson 2.10

* **Everyday Mathematics**, Lesson 2.10, 3.6
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.
*Use partial-sums, traditional and other algorithms to develop a successful strategy for addition

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

*Add three 2-digit numbers mentally

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

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

7. Check the reasonableness of results of computations.
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

8. Understand and use the inverse relationship between addition and subtraction.
   *Frames and Arrows


*Diagramming Number Stories

*Understand parts to whole relationships using addition and subtraction.

*Develop and find missing addends.

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

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

Everyday Mathematics, Lesson 2.11 and ongoing throughout the year
See also Function machines

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

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

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.
## 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

1. Identify and describe spatial relationships between objects in space and their relative shapes and sizes.

### Assessments

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

### Learning Experiences

- 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
- Anglegs

### Resources

- *Everyday Mathematics*, Unit 5
- NJ Mathematics Curriculum Frameworks K-2, selected activities
- *Teaching Student Centered Mathematics, K-3*, Lovin and Van de Walle

*Inside/outside, left/right, above/below, between

*Smaller/larger/same size, wider/narrower, longer/shorter

*Congruence (same size and shape)
Flemington-Raritan School District
Mathematics Curriculum

*Sort and classify objects according to attributes.

*Define, name and draw point and line segments,

*Introduce concept of parallel

Everyday Mathematics, Lesson 5.4
Teacher supplement

Everyday Mathematics, Lesson 5.2

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

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

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

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

* 3D Figures-cube, rectangular prism, sphere, cone, cylinder, and pyramid
*Identify names and characteristics of quadrangles, beyond square and rectangle

*Relationships between three-and two dimensional shapes

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

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

B. Transforming Shapes

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

2. Combine and subdivide simple shapes to make other shapes
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
* Length- inch, foot, yard, centimeter, meter

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

* Introduce the mile and kilometer

* Weight- pound, gram, kilogram
  * ounce

* Capacity- pint, quart, liter

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

* Tell time to five minute intervals

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

Everyday Mathematics, Lesson 9.3
Teacher supplement
Website resources
Inch by Inch, Leo Lionni

Everyday Mathematics, Lesson 9.5

Everyday Mathematics, Lesson 2.8, 7.5, 9.9

Everyday Mathematics, Lesson 9.8
Create class table of equivalencies
Elementary School Mathematics with Pizzazz, Creative Publications

Everyday Mathematics, Lesson 1.3, 5.1, 12.1 – 12.3

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.

*Estimate measures

E. Measuring Geometric Objects

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

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

* Develop the concept of area as square units

*Investigate perimeter and area relationship

*Explore concept of volume

Website resources
## 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?

<table>
<thead>
<tr>
<th>Knowledge/Skills/Understandings</th>
<th>Assessments</th>
<th>Learning Experiences</th>
<th>Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. Patterns</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| 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  
Angles | *Everyday Mathematics, 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 |             |                     | *Everyday Mathematics, Lesson 1.10  
Teacher Supplement |
| *Complete number sequences; identify and use number patterns to solve problems. |             |                     | *Everyday Mathematics Lesson 1.1, 1.8, 1.10 |
| *Solve Number Grid Puzzles |             |                     | *Everyday Mathematics, Lesson 1.8 |
## 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.
   - "Complete two rule "Frames-and-Arrows" diagrams

   *Teacher supplement
   *Teaching Student-Centered Mathematics, K-3, Lovin and Van de Walle
   *Everyday Mathematics, Lesson 2.11
   *Everyday Mathematics, Lesson 2.10, 3.6

## C. Modeling

1. Recognize and describe changes over time (e.g., temperature, height).
   - "Interpreting pictures, tally charts, pictographs, bar graphs, and Venn diagrams
   - "Collecting daily weather data

   *Teacher supplement
   *Teacher Supplement Website resources
   *Teacher Supplement Website resources

2. Construct and solve simple open sentences involving addition or subtraction.
   - "Result unknown (e.g., 6 - 2 = ___ or n = 3 + 5)

   *Everyday Mathematics, activities, ongoing throughout the year
   *Teacher supplement with website resources and other published worksheets
   *Ongoing activities throughout the year
   *Elementary School Mathematics with Pizzazz, Creative Publications
<table>
<thead>
<tr>
<th>*Part unknown (e.g., $3 + _ = 8$)</th>
<th></th>
<th>Ongoing activities throughout the year EM Skills Link</th>
</tr>
</thead>
<tbody>
<tr>
<td>D. Procedures</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| *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 |
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?  

<table>
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</thead>
<tbody>
<tr>
<td><strong>A. Data Analysis</strong></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
| 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 | Navigations in Data Analysis and Probability in K-2, NCTM, selected activities  
NJ Mathematics Framework, grades K-2, selected activities |

* Data collected from students' everyday experiences.  

*Collecting daily weather data  

* Data generated from chance devices, such as spinners and dice  

Everyday Mathematics, Lesson 3.5, 6.3, 7.6  
Website resources  

Daily morning activities, ongoing throughout the year  

* Data collected from students' everyday experiences.
2. Read, interpret, construct and analyze displays of data

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

*Smallest to largest, most frequent, mode

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

*Review range of data

B. Probability

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

*Certain, impossible

*More likely, less likely, equally likely

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

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

Everyday Mathematics, Lesson 10.10, 12.7
Teacher supplement

Everyday Mathematics, Lesson 3.5, 7.6, 12.7
Website resources
Teacher supplement

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

Teacher Supplement
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
1. Follow simple sets of directions

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

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

4. Explore concrete models of vertex-edge graphs

*Paths from one vertex to another*

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

District-teacher made worksheets
Website resources for maps

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

Navigations Through Geometry PreK-2, NCTM
Teacher supplement
**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?

<table>
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<tbody>
<tr>
<td><strong>A. Problem Solving</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| 1. Learn mathematics through problem solving inquiry and discovery. | Unit Assessments | Direct Instruction | *Teaching Student-Centered Mathematics, Grades K-3, Lovin and Van de Walle*  
*Best of Math I and II, Exemplars CD*  
Website resources for open-ended problems |
|                               | Do Now      | Collaborative and  |
|                               | Teacher Observation | Cooperative Learning |
|                               | Discussion   | Open Ended Writing Tasks |
|                               | Open Ended Writing Tasks | Open Ended Writing Tasks |
|                               | Recognizing Student Achievement sections in Everyday Math 3 | EM Games |
|                               |              | Exemplars |
|                               |              | Anglegs |
|                               |              | Pattern Blocks |
|                               |              | Attribute Blocks |
|                               |              | 3-D Shapes |
|                               |              | MIRA reflection mirrors |

2. Solve problems that arise in mathematics and in other contexts.

Best of Math I and II, Exemplars 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 form 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
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).
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.
3. Select and use various types of reasoning and methods of proof.

4. Rely on reasoning, rather than answer keys, teachers, or peers, the 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)
* 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.

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

Teacher supplement
Website resources
Texas Instruments resources

TI-1 08

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

Activities in conjunction with technology teacher and or science lessons
### Third Grade Math Pacing Guide

<table>
<thead>
<tr>
<th>Unit</th>
<th>Number of Days (approximate)</th>
<th>Unit</th>
<th>Number of Days (approximate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 . Routines/Review &amp; Assessment</td>
<td>16</td>
<td>7 . Multiplication &amp; Division</td>
<td>15</td>
</tr>
<tr>
<td>2 . Adding &amp; Subtracting Whole Numbers</td>
<td>15</td>
<td>8 . Fractions</td>
<td>11</td>
</tr>
<tr>
<td>3 . Linear Measures &amp; Area</td>
<td>14</td>
<td>9 . Multiplication &amp; Division</td>
<td>17</td>
</tr>
<tr>
<td>5 . Place Value, Whole Numbers &amp; Decimals</td>
<td>16</td>
<td>11 . Probability</td>
<td>8</td>
</tr>
<tr>
<td>6 . Geometry</td>
<td>15</td>
<td>End-of-the-Year Benchmark Assessment</td>
<td>1</td>
</tr>
</tbody>
</table>
Flemington-Raritan School District  
Mathematics Curriculum

| Mid-Year Benchmark Assessment | 1 |

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?

<table>
<thead>
<tr>
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<th>Learning Experiences</th>
<th>Resources</th>
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</thead>
</table>
| **A. Number Sense**             | 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 |

1. Use real-life experiences, physical materials, and technology to construct meanings for numbers.
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
3. Identify whether any whole number is odd or even.

4. Explore the extension of the place value in decimals through hundredths
   *Identify place value in decimals
   *Read and write 1-, 2-, 3-digit decimals (D/S)

5. Understand the various uses of numbers
   *Counting, measuring, labeling
   *Counting money
   *Find factors of a number
   *Find equivalent fractions
   *Investigate positive and negative numbers

6. Compare and order numbers

Flemington-Raritan School District
Mathematics Curriculum

Everyday Mathematics, activities ongoing throughout the year
Teacher supplement

Teacher supplement
Everyday Mathematics, Unit 5 activities
Everyday Mathematics, Lesson 5.7 - 5.10
Everyday Mathematics Lesson 1.9, 1.10, 5.8 5.11, 6.10, 9.1, 9.5

Everyday Mathematics, Lesson 1.1, 9.5, 10.1 - 10.5
Everyday Mathematics, Lesson 9.6
Everyday Mathematics, Lesson 8.4, 8.5, 9.3
Everyday Mathematics, Lesson 9.13
Everyday Mathematics, Unit 5 Elementary School Mathematics with Pizzazz, Creative Publications
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.
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
*Use basic facts to solve fact extensions

*Complete multiplication/division fact families

*Know multiplication facts up to 12 x 12

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

*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

*Solve extended multiplication facts to hundreds x hundreds

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

Everyday Mathematics, Unit 2, 7

Games: Rio; Salute,

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

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

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

Everyday Mathematics Lessons 7.6, 7.8, 9.1, 9.2

Everyday Mathematics, Lessons 7.6, 7.8, 9.1, 9.2

Everyday Mathematics, Lesson 7.6, 7.8, 9.1, 9.2
Website resources
Flemington-Raritan School District
Mathematics Curriculum

*Interpret remainders in division problems

*Recognize and know square products

3. Construct, use and explain procedures for performing whole number calculations with:
   * Pencil and Paper
   * Mental Math
   * Calculator

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

*Addition of 3-digit numbers

*Subtraction of 3-digit numbers

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

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

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

Teacher supplements

Everyday Mathematics, Unit 2
EM Skills Book
Website resources

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
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

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

   *Solve number stories involving equal sharing and equal grouping

   *Solve number stories involving positive and negative numbers

7. Check the reasonableness of results of computations
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.

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

   *Estimating Costs

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

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

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

<table>
<thead>
<tr>
<th>Knowledge/Skills/Understandings</th>
<th>Assessments</th>
<th>Learning Experiences</th>
<th>Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building upon knowledge and skills gained in preceding grades, by the end of grade 3, students will:</td>
<td>Unit Assessments</td>
<td>Direct Instruction</td>
<td>Teaching Student-Centered Mathematics, Grades K-3, Grades 3-5, Lovin and Van DeWalle, page 42-43, 245</td>
</tr>
</tbody>
</table>

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)

*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
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, Mitumasa 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
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

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

B. Transforming Shapes

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

2. 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.

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.

*Length- fractions of an inch (1/4, 1/2), mile, decimeter, kilometer, *Length- centimeter, meter (grade 3 secure)

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

*Area-square inch, square centimeter

*Weight-ounce
Flemington-Raritan School District
Mathematics Curriculum

*Consider relationships between weight and volume

* Capacity- fluid ounce, cup, gallon, milliliter

*Measure angles

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

5. Solve problems involving elapsed time

E. Measuring Geometric Objects

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

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

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

  *Explore the volume of rectangular prisms

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

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

District teacher made supplements

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

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

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

Everyday Mathematics, Lesson 10.2, 10.4
### 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?

<table>
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<th>Learning Experiences</th>
<th>Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. Patterns</strong></td>
<td></td>
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</tr>
<tr>
<td>1. Recognize, describe, extend, and create patterns.</td>
<td>Unit Assessments</td>
<td>Direct Instruction</td>
<td><em>Everyday Mathematics</em>, Lesson 1.12, 2.3, 7.1, 9.4, <em>Navigations in Algebra</em>, grades 3-5, NCTM</td>
</tr>
</tbody>
</table>

*Descriptions using words and number sentences/expressions*

*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)*

*Identify and use number patterns to solve problems*

*Use of a calculator to explore patterns*
Flemington-Raritan School District
Mathematics Curriculum

B. Functions & Relationships

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

*Input/output tables; T charts
*Complete "What's My Rule?" tables

*Complete "Frames and Arrows" problems

Everyday Mathematics, Lesson 7.4, 7.5

Groundworks- Algebraic Thinking, Creative Publications

Everyday Mathematics, Lesson 2.3

Everyday Mathematics, Lesson 2.5

C. Modeling

1. Recognize and describe change in quantities.
*Graphs representing change over time (e.g., temperature, height)

2. Construct and solve simple open sentences involving addition or subtraction (e.g., 3 + 6 = __, n = 15 - 3, 3 + ___ = 3, 16 - c = 7).

Teacher supplement
Everyday Mathematics, Lesson 5.12

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 x 7 = 7 x 3)

*Turn-around facts

Teacher-made supplements
NJ Mathematics Framework Curriculum, grades 3-4, selected activities
Identity element for multiplication is 1 (e.g., 1 x 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
### 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?

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</tr>
</thead>
<tbody>
<tr>
<td>A. Data Analysis</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| 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*

  *Make a frequency table*

  *Find the mean of a data set*
Flemington-Raritan School District
Mathematics Curriculum

*Find the mode of the set of data

*Find the range of data

Everyday Mathematics, Lesson 1.5

Teacher supplement

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

Exemplars, Best of Math I and II CD

Everyday Mathematics, Lesson 11.9

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

*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, 114, 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
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

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

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).
2. Explore vertex-edge graphs
   *vertex, edge
   *path

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

<table>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>A. Problem Solving</strong></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
| **1. Learn mathematics through problem solving inquiry and discovery** | Unit Assessments | Direct Instruction | *Everyday Mathematics*, Open Response questions & activities ongoing throughout the year  
*Best of Math I and II, Exemplars CD*  
*About Teaching Mathematics*, Marilyn Burns  
*Elementary School Mathematics with Pizzazz*, Creative Publications  
*Groundworks*, Creative Publications |
|                                 | Do Now/Ticket In/Exit Ticket | Collaborative and Cooperative Learning |           |
|                                 | Teacher Observation | Open Ended Writing Tasks |           |
|                                 | Discussion | EM Games & Activities |           |
|                                 | Open Ended Writing Tasks | Calendar skills |           |
|                                 | Recognizing Student | Pattern Blocks |           |
|                                 | Achievement sections in | Cuisenaire Rods |           |
|                                 | Everyday Math 3 | Tangrams |           |
|                                 |                        | Geoboards |           |
|                                 |                        | Geosolids |           |
|                                 |                        | Polygon Tiles |           |
|                                 |                        | Balance/Scale/Weights |           |
|                                 |                        | Master Rulers |           |
|                                 |                        | Mira (mirrors) |           |

**2. Solve problems that arise in mathematics and in other contexts**

*Best of Math I and II, Exemplars CD*  
*NJ Mathematics Curriculum Frameworks*, page 51 - 53
Flemington-Raritan School District  
Mathematics Curriculum

* Open ended problems
  - Best of Math I and II, Exemplars CD
  - Navigation Series, NCTM selected problems
  - Sample NJASK Open-ended problems
  - NJASK State Rubric
  - Website resources
  - Teacher supplement

* Non-routine problems
  - Best of Math I and II, Exemplars CD
  - Sample NJASK Open-ended problems
  - Website resources
  - Teacher Supplement

* Problems with multiple solutions
  - Best of Math I and II, Exemplars CD
  - Sample Open-ended problems from other states
  - Website resources
  - Teacher supplement
  - *Groundworks*, Creative Publications

* Problems that can be solved in several ways
  - Best of Math I and II, Exemplars CD
  - Navigation Series, 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.

4. Pose problems of various types and levels of difficulty

* Everyday Mathematics, Problem solving: verbal, pictorial, concrete and symbolic, teacher's guide ongoing
  - Best of Math I and II, Exemplars CD
  - Navigation Series, NCTM selected problems
  - Website resources for Open-ended problems
  - *Elementary School Mathematics with Pizzazz*, Creative Publications
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., 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).
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Mathematics Curriculum

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.

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

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

Everyday Mathematics Activities, ongoing throughout the year
NJ Mathematics Curriculum Framework, selected activities, grade 3-4

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

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

Best of Math I and II, Exemplars CD
Sample open-ended problems from various Website resources
NJASK State rubric

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.

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)

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

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

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)

* 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.

Everyday Mathematics activities ongoing throughout the year
Sample open-ended problems from NJASK and other states

Everyday Mathematics activities ongoing throughout the year
Teacher supplement with website resources
Everyday Mathematics, Lesson 5.12, 11.5

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

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

Everyday Mathematics, calculator activities ongoing throughout the year
Teacher made materials in conjunction with Technology teacher
Website resources
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).

*Introduce memory keys on a calculator

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).

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

Teacher supplement
Website resources
Texas Instruments resources

*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

NCTM’s Illuminations website
National Library of Virtual Manipulatives website

Teacher supplement with websites in conjunction with Technology teacher
Texas Instrument website lessons
### Fourth Grade Math Pacing Guide

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

<table>
<thead>
<tr>
<th>Knowledge/Skills/Understandings</th>
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<th>Resources</th>
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</thead>
<tbody>
<tr>
<td>A. Number Sense</td>
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<tr>
<td>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)</td>
<td>Unit Assessments</td>
<td>Direct Instruction</td>
<td>Groundworks- Reasoning with Numbers, Creative Publications</td>
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<tr>
<td></td>
<td>Do Now</td>
<td>Collaborative and Cooperative Learning</td>
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<td></td>
<td>Teacher Observation</td>
<td>Open Ended Writing Tasks</td>
<td>Frame Fun Fraction Factory</td>
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<td>Discussion</td>
<td>Games</td>
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<tr>
<td></td>
<td>Open Ended Writing Tasks</td>
<td>Base Ten Blocks</td>
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<td>Recognizing Student Achievement sections in Everyday Math 3</td>
<td>Digi-blocks</td>
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<td>Pattern Blocks</td>
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<td>Place value mat or chart</td>
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<tr>
<td></td>
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<td>Fraction pieces</td>
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<td>Fraction Circles</td>
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<td></td>
<td>Cuisenaire Rods</td>
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<td>Tangrams</td>
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<td>Geoboards</td>
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</table>

* Give equivalent names for numbers.

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

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
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)

* Compare large numbers

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 7.1 - 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

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

* Compare and order decimals

7. Explore settings that give rise to negative numbers.

*Temperatures below zero degrees, debts

*Extension of the number line

* Add positive and negative numbers; integers

* Use exponential notation to represent powers of ten

Everyday Mathematics, Lesson 7.9 - 7.11

Everyday Mathematics, Lesson 4.2

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

Teacher supplement
Weather/Science Unit

*Extension of the number line

* Add positive and negative numbers; integers

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
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.

   *Addition and subtraction: joining, separating, comparing

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

   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

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

   Rio

   Everyday Mathematics, Lesson 1.7, 2.7, 2.9
   Website Links:
   Exemplar: Lost Count (Farmer Brown)
   Anno’s Hat Tricks, Akihiro Nozaki Everyday Mathematics Lesson 3.7, 3.11
Flemington-Raritan School District  
Mathematics Curriculum

*Multiplication: repeated addition, area/array

*Division: repeated subtraction, sharing

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

*Solve multiplication and division 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") and then commit them to memory.

* Solve basic multiplication/division facts to 10

* Solve basic multiplication/division facts to 12

* Review square numbers

* Multiplication: repeated addition, area/array

*Division: repeated subtraction, sharing

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

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* Solve basic multiplication/division facts to 10

* Solve basic multiplication/division facts to 12

* Review square numbers
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

*Multiplication of 2-digit numbers

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

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

*Construct and use procedures for performing decimal multiplication and division

6. Count and perform simple computations with money.

*Standard dollars and cents notation

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.

8. Check the reasonableness of results of computations.

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

Everyday Mathematics, Lesson 2.9
Funny Numbers – Greg Tang

Everyday Mathematics, Lesson 5.5, 5.6, 5.7

Everyday Mathematics, Lesson 6.1, 6.2, 6.3, 6.4

Everyday Mathematics, Lesson 4.6
Money

Everyday Mathematics, Lesson 9.8, 9.9

Everyday Mathematics, Lesson 4.6
Exemplar: Skating Party

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

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

Everyday Mathematics, Activities ongoing throughout the year
Lesson 3.8
Everyday Mathematics, Lesson 12.4, 12.5
9. Use concrete models to explore addition and subtraction with fractions.  
  
* Add and subtract fractions

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

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.

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

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

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

* Estimate sums
* Estimate products

* Round whole numbers to a given place
# 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?

<table>
<thead>
<tr>
<th>Knowledge/Skills/Understandings</th>
<th>Assessments</th>
<th>Learning Experiences</th>
<th>Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. Geometric Properties</strong></td>
<td></td>
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</tr>
<tr>
<td>1. Identify and describe spatial relationships of two or more objects in space.</td>
<td>Unit Assessments</td>
<td>Direct Instruction</td>
<td><em>Everyday Mathematics</em>, activities ongoing throughout the year</td>
</tr>
<tr>
<td></td>
<td>Do Now</td>
<td>Collaborative and Cooperative Learning</td>
<td><em>Groundworks: Reasoning with Geometry</em></td>
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<td></td>
<td>Teacher Observation</td>
<td>Open Ended Writing Tasks</td>
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<tr>
<td></td>
<td>Discussion</td>
<td>EM Games</td>
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<td></td>
<td>Open Ended Writing Tasks</td>
<td>Polygon Tiles</td>
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<td></td>
<td>Recognizing Student Achievement sections in Everyday Math 3</td>
<td>Centimeter cubes</td>
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<tr>
<td></td>
<td>Geometry Riddles, “I have, who has” Match up game</td>
<td>Geometry solids</td>
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</tr>
<tr>
<td></td>
<td>Polygon tiles, tangrams, pattern blocks</td>
<td>“I have, who has” Match up game</td>
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<tr>
<td></td>
<td>Mira/ Transparent Mirror</td>
<td>Mira/ Transparent Mirror</td>
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<td>Angelegs</td>
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<td>Protractor</td>
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<td>Master Rulers</td>
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<td>MIRA –transparent mirrors</td>
<td>MIRA –transparent mirrors</td>
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<td></td>
<td>Project 6: Building &amp; Viewing Structures</td>
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</tr>
</tbody>
</table>

*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

Teacher-made supplements: *Teaching Student-Centered Mathematics, Grades 3-5*, Lovin and VanDeWalle, page 246

Teacher-made supplements: Directions using a map

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

Teacher-made supplements:
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

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

  * Identify properties of polygons and distinguish between convex and concave (nonconvex) polygons
  * 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
3. Identify and describe relationships among 2-D shapes.

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

*Congruence

*Lines of symmetry

* Lines of reflection

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

*Point, line, line segment, endpoint

*Ray

*Parallel, perpendicular (symbols: || and \(\perp\))
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 6.6, 6.7

Everyday Mathematics, Lesson 1.3, 6.5, 6.7

Navigations through Geometry in grades 3-5, NCTM

* Use a map scale to estimate distances

Everyday Mathematics, Lesson 2.1, 3.6, Unit 6, Unit 8

Everyday Mathematics, Lesson 10.5

Ed Emberley's Picture Pie: A Circle Drawing Book, Ed Emberley

Everyday Mathematics, Lesson 10.5

Grandfather's Tang Story, Ann Tompert
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

Everyday Mathematics, Lesson 6.5

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

Hurkle

Everyday Mathematics, Lesson 6.8, 6.9
Teacher supplement
Fly on the Ceiling, Julie Glass
Everyday Mathematics, Lesson 6.9
Teacher supplement
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.

Length -- fractions of an inch (1/8, 1/4, 1/2), mile, centimeter (grade 2 Secure), decimeter, kilometer

* Length -- millimeter

* Area -- square inch, square centimeter

* Draw and measure line segments to the nearest centimeter

* Draw and measure line segments to the nearest millimeter

* Volume -- cubic inch, cubic centimeter

* Weight -- ounces / grams

   * Estimate the weight of objects in ounces or grams and weigh objects in ounces or grams

   balance, scale
Flemington-Raritan School District
Mathematics Curriculum

*Capacity – fluid ounce, cup, gallon, milliliter

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).

*Use a map scale to estimate distances.

*Convert between metric measures

* Express metric measures with decimals.

*Identify locations on Earth for which latitude and longitude are given: find latitude and longitude for given locations.

5. Solve problems involving elapsed time

Everyday Mathematics, Lesson 11.7
Best of Math Exemplars II CD Rom
The King’s Chessboard, David Birch
One Grain of Rice: A Mathematical Folktales, Demi
Teaching Student Centered Mathematics, Grades 3-5, Lovin and VanDeWalle, page 265-266

Everyday Mathematics, Lesson 4.9
Teaching Student Centered Mathematics, Grades 3-5, Lovin and VanDeWalle, page 278-280

Everyday Mathematics, Lesson 2.1, 3.6, 6.8, 6.9
See Social Studies NJ Unit on map scales

Everyday Mathematics, Lesson 4.9

Everyday Mathematics, Lesson 6.9
See Social Studies NJ Unit/ longitude/latitude

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
E. Measuring Geometric Objects

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

2. Distinguish between perimeter and area and use each appropriately in problem-solving situations.

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

*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?

<table>
<thead>
<tr>
<th>Knowledge/Skills/Understandings</th>
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<tbody>
<tr>
<td><strong>A. Patterns</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| 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 | *Everyday Mathematics*, Lesson 10.5 |
| *Descriptions using words, number sentences/expressions, graphs, tables, variables (e.g., shape, blank, or letter)* |             |                      |           |
| *Sequences that stop or that continue indefinitely* |             |                      |           |
| *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,...)* |             |                      |           |
| *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...)* |             |                      |           |

*Navigations through Algebra 3-5, NCTM  
Teaching Student-Centered Mathematics, Grades 3-5, Lovin and VanDeWalle  
Teacher Supplement  
Illuminations website  
Teaching Student-Centered Mathematics, Grades 3-5, Lovin and VanDeWalle, page 293  
Teacher Supplement  
Teaching Student-Centered Mathematics, Grades 3-5, Lovin and VanDeWalle, page 294*
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

C. Modeling

1. Recognize and describe change in quantities.
   *Graphs representing change over time (e.g., temperature, height)

   *Solve problems involving elapsed time

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

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., \(3 \times 6 = \_\_\_\_\), \(n = 15 \div 3\), \(3 \times \_\_\_ = 0\), \(16 - c = 7\)).

*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 \(2 \times 4\) or \(4 \times 25\))
*Division by zero is undefined

*Any number multiplied by zero is zero

* Determine whether number sentences are true or false

* Insert parentheses to make true number sentences. Solve problems with parentheses

2. Understand and use the concepts of equals, less than, and greater than in simple number sentences.
*Symbols ( =, <, > )
### 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?

<table>
<thead>
<tr>
<th>Knowledge/Skills/Understandings</th>
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<th>Learning Experiences</th>
<th>Resources</th>
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</thead>
<tbody>
<tr>
<td><strong>A. Data Analysis</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Collect, generate, organize, and display data in response to questions, claims, or curiosity.</td>
<td>Unit Assessments, Do Now, Teacher Observation, Discussion, Open Ended Writing Tasks, Recognizing Student Achievement sections in Everyday Math 3</td>
<td>Direct Instruction, Collaborative and Cooperative Learning, Open Ended Writing Tasks, EM Games, Attribute blocks, Polygon Tiles, Venn Diagrams, Graphs/Charts</td>
<td>* Everyday Mathematics, Lessons 2.5, 2.6, &amp; 2.8, 12.1 - 12.5</td>
</tr>
<tr>
<td><em>Data generated from the school environment</em></td>
<td>Project 5: Which Soft Drink is the Best Buy?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Read, interpret, select, construct, analyze, generate questions about and draw inferences from displays of data.</td>
<td><em>Pictograph, bar graph, line plot, line graph, table</em></td>
<td></td>
<td>*Navigations through Data Analysis and Probability, 3-5, NCTM Teaching Student Centered Mathematics 3-5, Lovin and Van DeWalle, page 321</td>
</tr>
<tr>
<td><em>Average (mean), most frequent (mode), middle term (median)</em></td>
<td>* Display data in a line plot</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Everyday Mathematics Unit 2, 5.11 Teaching Student-Centered Mathematics, Grades 3-5, Lovin and Van De Walle, page 329*

*Everyday Mathematics, Lesson 2.8, 9.6 Illuminations website*

*Teaching Student Centered Math 3-5, page 326-328, LouAnn Lovin and John Van DeWalle*
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

2. Determine probabilities of simple events based on equally likely outcomes and express them as fractions.

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).

  *What students think will happen (intuitive)
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
District teacher-made worksheets
NJ Mathematics Curriculum Framework, selected activities for grades 3-4
District teacher-made worksheets

*Vertex, edge, neighboring/adjacent, number of neighbors

*Path, circuit (i.e., path that ends at its starting point)

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?

<table>
<thead>
<tr>
<th>Knowledge/Skills/Understandings</th>
<th>Assessments</th>
<th>Learning Experiences</th>
<th>Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. Problem Solving</strong></td>
<td></td>
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</tbody>
</table>
| 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  
*Inside the Amazon*, Don Lessem and Michael Rothman  
*Elementary School Mathematics with Pizzazz*, Creative Publications  
*Everyday Mathematics*, activities ongoing throughout the year |
| 2. Solve problems that arise in mathematics and in other contexts | | | *Incredible Comparisons*, Russell Ash  
*Everyday Mathematics*, Unit 9  
*Everyday Math*, World Tour Lessons |
| *Open ended problems* | | | *Best of Math I and II*, Exemplars CD  
Website resources  
Sample open-ended assessment problems from various states  
*Groundworks*, Creative Publications  
*Read It, Draw It Solve It*, Dale Seymour  
*Explain It*, 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
Guiness 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
Flemington-Raritan School District
Mathematics Curriculum

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.

Use NJ state rubric for mathematics
Website resources
Everyday Math Open Response rubrics

Illuminations website
Teacher supplement
Math Curse, Jon Scieszka

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

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

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

Best of Math I and II Exemplars, CD
NJ state rubric
Website resources
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.

D. Reasoning

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

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

* Develop reasoning skills

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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Mathematics Curriculum

*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
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).
# Fifth Grade Math Pacing Guide

<table>
<thead>
<tr>
<th>Unit</th>
<th>Number of Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>1- Number Theory</td>
<td>12</td>
</tr>
<tr>
<td>2. Estimation and Computation</td>
<td>13</td>
</tr>
<tr>
<td>3. Geometry Explorations &amp; The American Tour</td>
<td>13</td>
</tr>
<tr>
<td>4. Division</td>
<td>10</td>
</tr>
<tr>
<td>5. Fractions, Decimals, and Percents</td>
<td>15</td>
</tr>
<tr>
<td>6. Using Data; Addition &amp; Subtraction of Fractions</td>
<td>13</td>
</tr>
<tr>
<td>Mid-Year Benchmark Assessment</td>
<td>1</td>
</tr>
<tr>
<td>7. Exponents and Negative Numbers</td>
<td>14</td>
</tr>
<tr>
<td>8. Fractions and Ratios</td>
<td>15</td>
</tr>
<tr>
<td>9. Coordinates, Area, Volume &amp; Capacity</td>
<td>13</td>
</tr>
<tr>
<td>10. Using Data; Algebra Concepts and Skills</td>
<td>12</td>
</tr>
<tr>
<td>11. Volume</td>
<td>10</td>
</tr>
<tr>
<td>12. Probability, Ratios, and Rates</td>
<td>10</td>
</tr>
<tr>
<td>End-of-the-Year Benchmark Assessment</td>
<td>1</td>
</tr>
</tbody>
</table>
Flemington-Raritan School District
Mathematics Curriculum

**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?

<table>
<thead>
<tr>
<th>Knowledge/Skills/Understandings</th>
<th>Assessments</th>
<th>Learning Experiences</th>
<th>Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. Number Sense</strong></td>
<td><strong>Teacher Observation/RSA</strong></td>
<td><strong>Place Value Puzzle</strong></td>
<td><strong>Place Value Poster</strong></td>
</tr>
<tr>
<td></td>
<td>(Recognizing student achievement);</td>
<td><strong>Literature Link</strong></td>
<td><strong>Everyday Mathematics</strong>, Lesson 2.10, 3.2.</td>
</tr>
<tr>
<td></td>
<td><strong>Test/Quiz;</strong></td>
<td><strong>Journal pages and math boxes</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Exit tickets</strong></td>
<td><strong>EM Activity: Place Value Puzzles</strong></td>
<td><strong>Everyday Mathematics</strong>, Lesson 2.10</td>
</tr>
<tr>
<td>• Whole numbers through millions</td>
<td><strong>Place Value Puzzle</strong></td>
<td><strong>EM Activity: Place Value Puzzles</strong></td>
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<td>(Grade 4 secure)</td>
<td><strong>(Grade 4 secure)</strong></td>
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<td><strong>Demonstrate an understanding of</strong></td>
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<td></td>
<td><strong>place value concepts.</strong></td>
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<td><strong>EM Unit 2 checking progress,</strong></td>
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<tr>
<td></td>
<td><strong>Use real numbers: house prices,</strong></td>
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<td><strong>stock market daily volume,</strong></td>
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<td></td>
<td><strong>bank account, profit / loss</strong></td>
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<td></td>
<td><strong>statements for companies, tax obligations</strong></td>
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<tr>
<td></td>
<td><strong>Know place value to billions</strong></td>
<td></td>
<td><strong>Everyday Mathematics</strong>, Lesson 2.10</td>
</tr>
<tr>
<td></td>
<td><strong>Know place value to hundredths</strong></td>
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<tr>
<td></td>
<td><strong>Understand the relative size of 1 million, 1 billion, 1 trillion</strong></td>
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</tr>
</tbody>
</table>
Flemington-Raritan School District
Mathematics Curriculum

*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

Everyday Mathematics, Lesson 2.7 and ongoing activities throughout the year; Sketchpad 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

Everyday Mathematics, Lesson 5.1, 5.2, Fraction Tiles, fraction circles, rulers

*Convert between mixed numbers and improper fractions

Pattern blocks, tan grams
Fraction Tiles, fraction circles

Everyday Mathematics, Lesson 5.2

*All decimals

EM, Unit 5 checking progress

EM Game: 2-4-5-10 Frac-Tac-Toe (Decimal Version)

Everyday Mathematics, Unit 5

* Rounding decimals

Discuss purposes for rounding decimals. Offer always down, always up, to nearest selected place. Ask when is each appropriate?

Everyday Mathematics, Lesson 5.5

2. Recognize the decimal nature of United States currency and compute with money.

EM Unit 4 checking progress

Everyday Mathematics, Lesson 2.4, 5.8
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

<table>
<thead>
<tr>
<th>Flemington-Raritan School District Mathematics Curriculum</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>3. Demonstrate a sense of the relative magnitudes of numbers</strong></td>
</tr>
<tr>
<td>EM Game: First to 100, Estimation Squeeze, Multiplication Bullseye. Discuss data used for circle graphs</td>
</tr>
<tr>
<td>Everyday Mathematics, - 5 Lesson 2.10, 4.3</td>
</tr>
<tr>
<td>How Much is a Million?, by David Schwartz</td>
</tr>
</tbody>
</table>

| **4. Use whole numbers, fractions, and decimals to represent equivalent forms of the same number.** |
| EM Unit 5 checking progress |
| Everyday Mathematics, Unit 5 |

| **3. Demonstrate a sense of the relative magnitudes of numbers** |
| EM Activity: Magnitude Estimates |
| Explore division with base ten blocks |
| Everyday Mathematics, Unit 4 |

| **3. Demonstrate a sense of the relative magnitudes of numbers** |
| 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 |
| EM Game: 2-4-5-10 Frac-Tac-Toe (Decimal Version) |
| Everyday Mathematics, Lesson 8.1, 8.7, 8.9 |

| **3. Demonstrate a sense of the relative magnitudes of numbers** |
| Everyday Mathematics, Lesson 8.1, 8.7, 8.9 |
| EM Probability Meter Poster |

| **3. Demonstrate a sense of the relative magnitudes of numbers** |
| Everyday Mathematics, Unit 5 |
| Middle School Mathematics with Pizzazz, selected activities |
| Sketchpad: Fraction tiles, Comparing Fractions, Feed the Mouse. |

| **3. Demonstrate a sense of the relative magnitudes of numbers** |
| Sketchpad: Fraction tiles, Comparing Fractions, Feed the Mouse. |
| Everyday Mathematics, - 5 Lesson 2.10, 4.3 |
| How Much is a Million?, by David Schwartz |

157
<table>
<thead>
<tr>
<th>Concept</th>
<th>Activity</th>
<th>Resource</th>
</tr>
</thead>
<tbody>
<tr>
<td>*Find decimals between pairs of numbers</td>
<td>Evaluation of written response with reasoning</td>
<td>Everyday Mathematics, Lesson 8.4, 8.5</td>
</tr>
<tr>
<td></td>
<td>Do Now, Exit Ticket</td>
<td>Balloon target website.</td>
</tr>
<tr>
<td></td>
<td>EM Game: Estimation Squeeze</td>
<td>Sketchpad: Zooming Decimals</td>
</tr>
<tr>
<td>*Convert among fractions, decimals and percents.</td>
<td>EM Unit 5 checking progress</td>
<td>Everyday Mathematics, Unit 5, 8.7, 8.9, 8.10</td>
</tr>
<tr>
<td></td>
<td>EM Game: Fraction / Percent Concentration, 2-4-5-10 Frac-Tac-Toe (Percent</td>
<td>Sketchpad: Stretchy Percent Ruler.</td>
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<td>Version)</td>
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</tr>
<tr>
<td>*Convert between fractions and mixed or whole numbers.</td>
<td>Use games, allow students to explore with manipulatives or models</td>
<td>Everyday Mathematics, Lesson 5.2, 8.12</td>
</tr>
<tr>
<td>*Convert between decimals, fractions and mixed numbers</td>
<td>Use games, allow students to explore with manipulatives or models</td>
<td>Everyday Mathematics, Lesson 5.6, 5.8, 5.10, 5.11, 8.8</td>
</tr>
<tr>
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<td>EM Game: Spoon Scramble</td>
<td>Middle School Mathematics with Pizzazz, Creative Publications, selected</td>
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<tr>
<td></td>
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<td>activities</td>
</tr>
<tr>
<td>*Find common denominators</td>
<td>Provide opportunities for students to find strategies for finding common</td>
<td>Everyday Mathematics, Lesson 6.9, 6.10</td>
</tr>
<tr>
<td></td>
<td>denominators</td>
<td>Website resources</td>
</tr>
<tr>
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<td>Sketchpad: Open the Safe</td>
</tr>
<tr>
<td>*Find equivalent fractions</td>
<td>Provide opportunities for students to explore equivalencies using paper</td>
<td>Everyday Mathematics, Lesson 5.4, 6.9, 6.10</td>
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<tr>
<td></td>
<td>folding and diagram modeling as well as use of other manipulatives or</td>
<td>Teacher supplement</td>
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<tr>
<td></td>
<td>models</td>
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<tr>
<td></td>
<td>EM activity: Using Fraction Sticks</td>
<td></td>
</tr>
<tr>
<td>*Finding a fraction of a number</td>
<td>Provide opportunities for students to model sets, paper fold and use</td>
<td>Everyday Mathematics, Lesson 5.1, 5.2, 8.4, 8.5</td>
</tr>
<tr>
<td></td>
<td>other manipulatives including number line</td>
<td>EM Bulletin Board of Fraction of a Fraction examples</td>
</tr>
<tr>
<td>Objective</td>
<td>Description</td>
<td>Resource</td>
</tr>
<tr>
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<tr>
<td>Explore meaning of and purpose of percent</td>
<td>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 same as 25% of $1 000</td>
<td>Everyday Mathematics, Unit 5 Teaching Student-Centered Mathematics, Grades 3-5, Lovin and Van de Walle.</td>
</tr>
<tr>
<td>Find percent of a number</td>
<td>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</td>
<td>Everyday Mathematics, Unit 5, Lesson 8.9, 8.11</td>
</tr>
<tr>
<td>Practice finding the whole, given a fraction or percent of the whole</td>
<td>Provide multiple opportunities to model using manipulatives Graphically explore rates: discuss continuous and discrete quantities, Demonstrate Distance, speed and time using CBR and graphing calculator</td>
<td>Everyday Mathematics, Lesson 5.1, 5.2, 6.5, 8.10</td>
</tr>
<tr>
<td>Review concept of rates; represent rates with formulas, tables, and graphs</td>
<td>Graphically explore rates: discuss continuous and discrete quantities, Demonstrate Distance, speed and time using CBR and graphing calculator</td>
<td>Everyday Mathematics, Lesson 10.4, 10.6 Website resources CBR / graphing calculator</td>
</tr>
<tr>
<td>Develop and apply number theory concepts in problem solving situations.</td>
<td>EM Game: Advanced Factor Captor EM Project 2: &quot;Deficient, Abundant, &amp; Perfect</td>
<td>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)</td>
</tr>
<tr>
<td>Identify even and odd numbers</td>
<td>Have students tell why number is even or odd Numbers”</td>
<td>EM Unit 1 checking progress</td>
</tr>
</tbody>
</table>
**Flemington-Raritan School District**  
**Mathematics Curriculum**

<table>
<thead>
<tr>
<th>Topic</th>
<th>Activity/Resource</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Primes, factors, multiples</strong></td>
<td>Project 1: The Sieve of Eratosthenes</td>
</tr>
<tr>
<td></td>
<td><em>Find the greatest common factor of two numbers</em></td>
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<td></td>
<td><em>Find the least common multiple of two numbers</em></td>
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<tr>
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<td><em>Represent square numbers as arrays and as numbers written as exponents</em></td>
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<tr>
<td></td>
<td>Refer to square root as un squaring a number: use squeeze method</td>
</tr>
</tbody>
</table>

- *Identify the factors of a number.*  
  EM Unit 1 checking progress  
  EM Activity: Factor pairs  
  EM Game: Factor Captor, Factor Bingo  
  EM Activity: Factor Rainbows, Square and Square Roots.  

- *Identify the prime factorizations of numbers*  
  Practice factor tree, write product of primes using exponents (EM uses factor strings)  

- *Identify prime and composite numbers*  
  Explore array strategy for finding primes  
  EM Project 1: The Sieve of Eratosthenes  

*Middle School Mathematics with Pizzazz, selected activities, Creative Publications  
Teacher supplement  
Sketchpad: Combination Locks, Factor Puzzles.*  

*Everyday Mathematics, Unit 1, 12.1*  
*Middle School Mathematics, Lesson 1.6*  
*Middle School Mathematics, Lesson 1.7*  
*Middle School Mathematics, Lessons 12.1*  
*Everyday Mathematics, Lesson 1.8*  
*Everyday Mathematics, Lessons 12.1*  
*Teacher supplement using other resource Sketchpad: Combination Locks.*
<table>
<thead>
<tr>
<th>Activity</th>
<th>Resource</th>
</tr>
</thead>
<tbody>
<tr>
<td>* Explore rates</td>
<td>Provide opportunities to solve number stories using rates</td>
</tr>
<tr>
<td>* Explore uses of ratios and way of expressing ratios</td>
<td>Provide opportunities to explore ratios in everyday life; model and solve problems involving ratios of part to whole relationship and number stories</td>
</tr>
<tr>
<td>* Solve rate story problems</td>
<td>EM, Unit 12 checking progress</td>
</tr>
<tr>
<td>* Introduce cross multiplication for solving ratio problems (proportions)</td>
<td>Practice setting up equivalent ratios that yield the same solutions.</td>
</tr>
<tr>
<td>6. Compare and order numbers.</td>
<td>EM Activity: Ranking States by Their Native-American Populations</td>
</tr>
<tr>
<td>* Order and compare positive and negative numbers</td>
<td>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</td>
</tr>
</tbody>
</table>

Everyday Mathematics, Lesson 12.1
Teacher supplement
Website resources
Teaching Student-Centered Mathematics in grades 3-5, 5-8, Lovin and Van de Walle
Middle School Mathematics with Pizzazz, Creative Publications
NJ Mathematics Curriculum Framework in grades 5-6, selected activities

Everyday Mathematics, Lesson 12.6, 12.7, 12.8
Teacher supplement
Best of Math I and II, Exemplars CD
Website resources

Everyday Mathematics, Lesson 12.2
Teacher supplement
Middle School Mathematics with Pizzazz, Creative Publications
Website resources

Everyday Mathematics, Lesson 2.10, 5.3, 7.7
Sketchpad: Jump Along.
<table>
<thead>
<tr>
<th>Topic</th>
<th>Description</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Explore -x as the “opposite of x” since x may be a positive or negative number</em></td>
<td><em>Order and compare fractions</em> Use 0, 1/2 and 1 as benchmarks, Provide students with Fraction pieces, stick chart or number line to support their ordering EM Game: Build It Explore as repeated multiplication Introduce calculator keys A and y to the x EM Game: Exponent Ball Create place value charts Discuss and show examples of standard form and number and word notation Give students practice writing numbers such as 4.2 million, 35 billion, 29.3 thousand, What is 8K? Explore relative size of numbers when distinguishing between positive and negative exponents for powers of ten</td>
<td><em>Understand and apply exponential notation</em> Everyday Mathematics, Lesson 7.1, 7.2, 7.3 <em>Understand and apply scientific notation</em> Everyday Mathematics, Lesson 7.1, 7.2, 7.3 <em>Introduce number and word notation for large numbers</em> Everyday Mathematics, Lesson 7.1, 7.2, 7.3 <em>Introduce exponential notation for powers of 10</em> Everyday Mathematics, Lesson 7.1, 7.2, 7.3</td>
</tr>
</tbody>
</table>
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

| * Demonstrate proficiency in basic facts for addition and subtraction and multiplication and division | EM Unit 1 Checking Progress | EM Game: Advanced version of Factor Captor Game | Everyday Mathematics, Unit 1 and ongoing throughout the year Website resources |
| * Draw arrays to model multiplication | EM Unit 1 Checking Progress | EM activity: Finding Rectangular Arrays in Perpetual Calendar Use array dot paper Geoboard Activity | Everyday Mathematics, Lesson 1.2 |
| * Find the quotient and remainder of a whole number divided by a 1-digit whole number | 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 | Middle School Mathematics with Pizzazz, selected activities |
| * Find the quotient and remainder of a whole number divided by a 2-digit whole number | EM Unit 4 Checking Progress, Part B. | EM Game: Division Dash Explore remainder uses and formats at length Student should use appropriate estimation | Everyday Mathematics, Lesson 4.1, 4.2 Middle School Mathematics with Pizzazz, selected activities Give extra practice: teacher made or published worksheets |
**Flemington-Raritan School District**  
**Mathematics Curriculum**

| *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.  
Provide practice appropriate to student need | *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**

- **Mental math**

- **Calculator**

- **Website resources**
### Flemington-Raritan School District Mathematics Curriculum

<table>
<thead>
<tr>
<th>Activity</th>
<th>Method/Resource</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>* Find the sum and difference of multi-digit whole numbers and decimals</td>
<td>EM whole class discussion. Review various algorithms for adding and subtracting numbers, include traditional. EM Games: Addition Top IT, Subtraction Target Practice.</td>
<td>* Everyday Mathematics, Lessons 2.2, 2.3, 2.4</td>
</tr>
<tr>
<td>* Find the product of multi-digit whole numbers, fractions, and decimals</td>
<td>EM Games: Multiplication Wrestling. EM Game: Fraction Capture, Mixed Number Spin, Fraction Action, Fraction Friction.</td>
<td>* Everyday Mathematics, Lesson 2.8, 2.9, 8.5, 8.6, 8.7</td>
</tr>
<tr>
<td>* Add and subtract fractions with common denominators</td>
<td>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,</td>
<td>* Everyday Mathematics, Lesson 6.8, 6.9, 6.10, 5.3. Middle School Mathematics with Pizzazz, Creative Publications, selected activities</td>
</tr>
<tr>
<td>* Add and subtract fractions with unlike denominators</td>
<td>Provide opportunities for visual and concrete experiences to help students to understand concept. EM Activity: Clock Fraction</td>
<td>* Everyday Mathematics, Lesson 5.3, 6.8, 6.9, 6.10</td>
</tr>
</tbody>
</table>
**Flemington-Raritan School District Mathematics Curriculum**

<table>
<thead>
<tr>
<th>Objective</th>
<th>Activity</th>
<th>Resource(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Use area model for fraction multiplication</em></td>
<td>EM Unit 8 checking progress, Part B.</td>
<td><em>Paper folding</em></td>
</tr>
<tr>
<td><em>Use an algorithm to multiply fraction, whole number and mixed numbers by a fraction of same</em></td>
<td>EM Unit 8 checking progress, Part B.</td>
<td>Student should understand reasons behind multiplication algorithm: provide ample opportunities for modeling using manipulatives EM Game: Fraction/Whole Number Multiplication Top It</td>
</tr>
<tr>
<td><em>Find the quotient for dividing a whole number by a whole number</em></td>
<td>EM Unit 4 checking progress</td>
<td>Review partial-quotients algorithm and traditional method. Encourage good estimating</td>
</tr>
<tr>
<td><em>Introduce strategy for dividing fractions</em></td>
<td></td>
<td>Provide opportunities for discussion and understanding, use manipulatives and models</td>
</tr>
<tr>
<td><strong>3. Use an efficient and accurate pencil-and-paper procedure for division of a 3-digit number by a 2-digit number.</strong></td>
<td>EM Unit 4 checking progress, Part B.</td>
<td>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</td>
</tr>
<tr>
<td><em>Use a divisibility test to determine if a number is divisible by another number.</em></td>
<td></td>
<td>Enrichment: Exploring a Divisibility test EM Activity: Divisibility Tests</td>
</tr>
<tr>
<td><em>Interpret the remainder in division number stories</em></td>
<td>EM Unit 4 checking progress</td>
<td>Provide visual representation of division using diagrams or models EM Activity: Solving division stories with remainders</td>
</tr>
<tr>
<td><strong>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.</strong></td>
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</tr>
<tr>
<td>* Solve number stories (addition and subtraction) (S)</td>
<td>* Solve number stories (addition and subtraction) (S)</td>
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</tr>
<tr>
<td><strong>5. Check the reasonableness of results of computations.</strong></td>
<td><strong>5. Check the reasonableness of results of computations.</strong></td>
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<tr>
<td><strong>6. Understand and use the various relationships among operations and properties of operations.</strong></td>
<td><strong>6. Understand and use the various relationships among operations and properties of operations.</strong></td>
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</tr>
<tr>
<td>* Understand how square numbers and their square roots are related</td>
<td>* Understand how square numbers and their square roots are related</td>
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</tr>
</tbody>
</table>

**Flemington-Raritan School District Mathematics Curriculum**

- *Divide decimal numbers by whole numbers with no remainders (B/D)*

**Division of Decimal Numbers**

- **Everyday Mathematics, Lesson 4.5**
- **Middle School Mathematics with Pizzazz, Creative Publications**

**Solving Number Stories**

- **Everyday Mathematics, Units 1, 2, 3, 8, 10**
- **Best of Math I and II, Exemplars CD**

**Checking Reasonableness of Results**

- **Everyday Mathematics, Lesson 2.4, 2.8**

**Understanding and Using Relationships**

- **Everyday Mathematics, Units 2.1, 2.5, 2.7, 2.8, 9.7**

**Supplemental Enrichment Activities**

- **Everyday Mathematics, Lesson 1.4, 1.5, 1.9, 4.1, 9.7**

**Creating and Exploring Patterns**

- **Everyday Mathematics, Lesson 1.7, 1.8**
C. Estimation

1. Use a variety of estimation strategies for both number and computation.

   *Make magnitude estimates for product of multi-digit numbers, including decimals

   Provides 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

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

   Provides ongoing opportunities for student guesses in estimation jars filled with a variety of objects.

Everyday Mathematics, Lesson 2.1, 2.5, 2.7

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

EM Activity: Estimation
EM Activity: Estimate Reaction Time
EM Activity: American Tour: Population estimates

Literature Link

Counting on Frank, Rusty Bresser
* 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.

Everyday Mathematics, Lesson 2.1, 2.5, 2.7

4. Determine whether a given estimate is an overestimate or an underestimate.

Everyday Mathematics, Lesson 2.1, 2.7
### 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?

<table>
<thead>
<tr>
<th>Knowledge/Skills/Understandings</th>
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<th>Learning Experiences</th>
<th>Resources</th>
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</thead>
<tbody>
<tr>
<td><strong>A. Geometric Properties</strong></td>
<td></td>
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</tr>
<tr>
<td>1. Understand, apply, and identify concepts involving lines and angles.</td>
<td>Teacher Observation/RSA (Recognizing Student Achievement) Test/Quiz Exit Ticket</td>
<td>Provide hands-on models</td>
<td><em>Everyday Mathematics</em> Unit 3 Website resources</td>
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<tr>
<td></td>
<td></td>
<td>Discuss and model appropriate examples</td>
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<tr>
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<td>Provide practice for students to name, write, draw, notations.</td>
<td><em>Everyday Mathematics</em>, Lesson 3.4, 3.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>including those found within 2-D and 3-D figures</td>
<td><em>Everyday Mathematics</em>, Lesson 3.5, 9.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Demonstrate using paper to show angle measures total 180 degrees</td>
<td><em>Everyday Mathematics</em>, Lesson 3.9 Website resources</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Explore different kinds of triangles and sizes</td>
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<tr>
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<td></td>
<td>Provide opportunities for students to explore the sums of angles;</td>
<td><em>Middle School Mathematics with Pizzazz</em>, selected activities</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Use appropriate software such as Geometer's Sketchpad or other internet resource</td>
<td>Website resources</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>Find the sum of the measures of the angles in any polygon</em></td>
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</tbody>
</table>
Flemington-Raritan School District
Mathematics Curriculum

*Determine angle measures based on relationships between angles

* 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

• Polygons by number of sides
• Equilateral, equiangular, regular
• All points equidistant from a given point form a circle

*Identify types of triangles

*Identify the base and height of triangles and parallelograms

EM Activity: Finding pattern-block angle measures.
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

*Identify the base and height of triangles

Use graph paper and geoboard activities to model heights and bases

Everyday Mathematics, Lesson 3.3, 3.4, 3.5, 3.9

Everyday Mathematics, Lesson 3.4, 3.5 Teacher supplement

Everyday Mathematics, Lesson 3.5 Teacher supplement

Everyday Mathematics, Lesson 3.6

Geometry solids, Polygon tiles

EM Game: Polygon Capture

Illuminations website

Everyday Mathematics, Lesson 3.7, 3.9

Everyday Mathematics, Lesson 3.6 Website resources

Everyday Mathematics, Lesson 9.5, 9.6
Flemington-Raritan School District
Mathematics Curriculum

3. Identify similar figures.

* Know the properties of geometric solids

* Identify faces, vertices and edges
(Grade 4 secure)

3. Understand and apply the concepts of congruence and symmetry (line and rotational).

B. Transforming Shapes

1. Use a translation, a reflection, or a rotation to map one figure onto another congruent figure.

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"

Use or create geosolid models
EM Game: 3-D Shape Sort,
EM Activity: polyhedral Dice,
EM Activity: Cube pattern,
EM Activity: rectangular Prism Pattern,

Use geosolids models
Literature Link

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"

Use geosolids models
Everyday Mathematics, Lesson 3.10
Teacher supplement
Sketchpad: Sliding Shapes

Everyday Mathematics, Lesson 11.1, 11.2
Website resources

Everyday Mathematics, Lesson 11.2
The Boy Who Reversed Himself, Flatland

Everyday Mathematics, Lesson 3.6, 3.8, 9.3
Teacher supplement

Everyday Mathematics, Lesson 3.6, 9.3
Teacher supplement

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

2. Recognize, identify, and describe geometric relationships and properties, as they exist in nature, art, and other real-world settings.

*Define and create tessellations

-Know properties of polygons

-Know names of geometric solids and compare properties of prisms, pyramids, cylinders and cones.

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

Use real applications

Provide models for student to explore

Provide students with models to explore and compare

Activity: “Lost in the Crowd”

Battleship game

EM Activity: Hidden Treasure

EM Activity: coordinates in a classroom

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 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.

Everyday Mathematics, Unit 3
Teacher supplement Illuminations website Geometry in the World of Art - Grades 3-5

Everyday Mathematics, Lesson 3.7
Teacher supplement

Everyday Mathematics, Lesson 1 1.1, 11.2
The Boy Who Reversed Himself, William Sleator

The Fly on the Ceiling, Julie Glass

Everyday Mathematics, Lesson 9.1, 9.2, 9.3

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
   - *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
   - *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 3.3, 3.4, 3.9, 9.4, 9.5, and 9.6
   Teacher supplement

   Everyday Mathematics, Lesson 9.4, 9.5, 9.6

   Middle School Mathematics with Pizzazz, Creative Publications, selected activities
*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).
**Flemington-Raritan School District Mathematics Curriculum**

*Examine the relationship among liter, milliliter, and cubic centimeter*

4. **Use measurements and estimates to describe and compare phenomena.**

* Understand the concept of capacity and how to calculate it

5. **Solve problems with elapsed time** (Grade 4 secure)

Use models to demonstrate equivalencies

**Everyday Mathematics, Lesson 9.10**

Project 8- Pendulums
Provide some informal indirect measurement examples

**Everyday Mathematics, Lesson 2.5, 10.5**

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**

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.
2. Develop and apply strategies and formulas for finding perimeter and area.

*Square

Use models to explore formulas

Graph paper, geoboard

Explore to find formula

Everyday Mathematics, Lessons 9.3, 9.4, 9.5, 10.8, and 10.9

**Everyday Mathematics, Math Masters**

**Sketchpad: Rectangles with Same Area, Rectangles with Same Perimeter.**

*Polygons

Use models, polygon tiles or other to explore area

Student not expected to generate formulas for all polygons, such as hexagon, pentagon etc.

Teacher supplement

Everyday Mathematics, Lesson 9.4

Everyday Mathematics Unit 9

*Triangles

Everyday Mathematics, Lesson 9.6

Math Masters

Sketchpad: Rectangles and Triangles.

Everyday Mathematics, Lesson 9.6

*Parallelograms

Everyday Mathematics, Lesson 9.4, 9.5, 9.6

*Identify the base and height of triangles and parallelograms

Explore using manipulatives and models

Geoboards, graph paper

Everyday Mathematics, Lesson 10.8 and 10.9

Teacher supplement

*Circles

Everyday Mathematics, Lesson 10.8 and 10.9

Teacher supplement

*Distinguish between circumference and area of circle problems

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

Everyday Mathematics, Lesson 10.8, 10.9

The Librarian Who Measured the Earth, Kathryn Lasky

Website resources for "pi"
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

Everyday Mathematics Lesson 10.8, 10.9

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 = 4units, w =3units, 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 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
*Understand the concept of surface area of a figure

* Find the surface area of prisms

* Understand how to find the surface area of cylinders

3. Recognize that rectangles with the same perimeter do not necessarily have the same area and vice versa.

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).

Geosolid with folding nets
Gather 3-D objects and discuss the faces and their coverings

Geosolid with folding nets
Explore surface area using nets and writing recipes for finding surface areas
Use everyday examples of cylinders

Explore rectangles using geoboard activities and other models

Everyday Mathematics, Lesson 11.7
Sketchpad: Perfect Package

Everyday Mathematics, Lesson 11.7
Teacher supplement

Everyday Mathematics Lesson 11.7

Everyday Mathematics Lesson 9.4

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?

<table>
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<tbody>
<tr>
<td><strong>A. Patterns</strong></td>
<td></td>
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</tr>
<tr>
<td>1. Recognize, describe, extend, and create patterns involving whole numbers.</td>
<td>Teacher Observation/RSA (Recognizing Student Achievement) Test/Quiz Exit Ticket EM Unit 10 checking progress</td>
<td>EM Activity: Number Patterns using dots, Math Masters. “Patterns that Grow” Provide multiple opportunities for exploring patterns involving manipulatives, numbers, models and other objects</td>
<td>Everyday Mathematics Units 1, 2, 7, 10 Teacher supplement Illuminations websites Sketchpad: The Envelope</td>
</tr>
<tr>
<td>• Descriptions using tables, verbal rules, simple equations, and graphs</td>
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<tr>
<td>*Explore Fibonacci Sequence</td>
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<tr>
<td>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</td>
<td>Teacher supplement Website and Library resources</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| **B. Functions & Relationships** |              |                      |           |
| 1. Describe arithmetic operations as functions, including combining operations and reversing them. | Allow student to explore ways to evaluate expressions | Discuss common symbols for words, e.g., twice, half | Everyday Mathematics Lesson 7.4, 7.5 Groundworks for Algebra, Creative Publications Sketchpad: Function Machines. |
| *Translate word descriptions into algebraic expression | | | Everyday Mathematics, Lesson 10.3 |
2. Graph points satisfying a function from T-charts, from verbal rules, and from simple equations.

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
     - Understand and apply the use of parentheses in number sentences
     - Identify if equation is true or false
   - Determine the value of a variable: use this value to complete a number sentence
   - Understand and apply order of operations to evaluate expressions and solve number sentences

   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
   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.
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)

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

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

Website resources
Website resources

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Website resources
Website resources

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
Website resources

Middle School Mathematics with Pizzazz, selected activities
Teaching Student Centered Mathematics, Grade 3-5 & 5-8, Lovin & Van de Walle, selected activities

Everyday Mathematics, Lesson 9.6, 10.3, 10.4, 10.5, 10.7.

www.everydaymath.org

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

Everyday Mathematics, Lesson 9.6, 10.3, 10.4, 10.5, 10.7.

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

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

Website resources
Website resources

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
Website resources
Flemington-Raritan School District
Mathematics Curriculum

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

2. Understand and use the concepts of equals, less than, and greater than in simple number sentences. (Grade 4 secure)
   * Symbols (<, >, =)

*Solve one-step pan-balance problems

*Solve two-step pan-balance problems

Demonstrate using manipulatives and models, then use symbols before using variables
Students should explore equation solving in cooperative groups
Begin with manipulatives and models

Incorporate use of these symbols when comparing all numbers including fractions and decimals

Apply these properties when simplifying numerical expression including whole numbers, decimals, fractions and integers.

Everyday Mathematics, Lesson 10.1.
Everyday Mathematics, Lesson 10.2.
SRB, American Tour Section
Website or library book resources
Teacher supplement
Middle School Mathematics with Pizzazz, Creative Publications

EM Unit 7 checking progress
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?

<table>
<thead>
<tr>
<th>Knowledge/Skills/Understandings</th>
<th>Assessments</th>
<th>Learning Experiences</th>
<th>Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Data Analysis</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Collect, use, generate, organize, and display data.</td>
<td>Teacher Observation/RSA (Recognizing Student Achievement) Unit 6 Checking Progress/Quiz Exit Ticket Evaluation of student completed projects</td>
<td>EM Activity: Class Data for number of States students / adults have visited EM Activity: Collecting Exercise Data</td>
<td>Everyday Mathematics, Lesson 6.1, 12.7 Best of Math I &amp; II, Exemplars CD</td>
</tr>
</tbody>
</table>

• 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

Everyday Mathematics, Lesson 3.1, 3.2, 6.1, 6.6
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
*Use a Percent Circle to find percents of circle graphs
*Measures pieces of a circle graph; interpret a circle graph

Everyday Mathematics, Lesson 5.10, 5.11
EM Math Masters
Find and use circle graphs
Use protractor to measure sectors

Everyday Mathematics, Lesson 6.5
Teacher supplement
*Construct circle graph

Everyday Mathematics, Lesson 5.11 Math Masters
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

Website sources for data

• range, median, and mean

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 Unit 2 checking progress
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
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

Explore examples of story telling graphically and then model.

Everyday Mathematics, Lesson 6.4, 10.7, 12.7
Teacher supplement

Everyday Mathematics, Lesson 6.5
Website resources
### 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

<table>
<thead>
<tr>
<th>Event, probability of an event</th>
</tr>
</thead>
<tbody>
<tr>
<td>EM Activity: US Census results on the Probability Meter</td>
</tr>
<tr>
<td>Everyday Mathematics, Lesson 2.6 and 12.2</td>
</tr>
<tr>
<td>Middle School Mathematics with Pizzazz, Creative Publications</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Probability of certain event is 1 and of impossible event is 0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whole class discussion about real events and their certainty or uncertainty e.g., day/night, drive to Europe from NY</td>
</tr>
<tr>
<td>Everyday Mathematics, Lesson 2.6</td>
</tr>
<tr>
<td>Teacher supplement</td>
</tr>
<tr>
<td>Probability Meter Poster</td>
</tr>
</tbody>
</table>

*Compute the probability of outcomes when choices are equally likely

- *Event, probability of an event

| Probability of certain event is 1 and of impossible event is 0

*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
Flemington-Raritan School District
Mathematics Curriculum

• 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

Use tree diagrams to find all possible ways a sequence of choices can be made (DS)

EM Activity: Venn Diagrams

Everyday Mathematics, Lesson 11.2, 12.2
Sample Open-ended problems form various sources

Use Multiplication Counting Principle and provide multiple opportunities to write out all possible outcomes

Jumanji, Chris Van Allsburg
Teacher supplement
2. Explore the multiplication principle of counting in simple situations by representing all possibilities in an organized way (e.g., you can make 3 x 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*

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)

   * Use models and design communication chains: office manager can talk with every employee, each employee can talk to office manager and one other employee

   * Use manipulatives and other models

   * Use museum, zoo, or school floor plans

Everyday Mathematics, Lesson 12.2
Explain It! Selected problems
Website resources
Sketchpad: How Many Ways

Everyday Mathematics, Lesson 6.2
Teacher supplement

Everyday Mathematics, Lesson 12.2
Middle School Mathematics with Pizzazz, Creative Publications

Everyday Mathematics, Lesson 12.2
Teacher supplement

NCTM website
Question Quest Level A

Fourth Grade Extension Activity: "Four-by-Four Block"

EM Activity: Probability Investigations

EM Game: Finish First
Design games to play and find strategies for winning: dice

EM Activity: Making Spinners Everyday Mathematics, Lesson 12.2
*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
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?

<table>
<thead>
<tr>
<th>Knowledge/Skills/Understandings</th>
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<th>Resources</th>
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</thead>
<tbody>
<tr>
<td>A. Problem Solving</td>
<td>Teacher</td>
<td>Provide multiple opportunities with partner/small group/independent investigations of problem solving using manipulatives and other models. Problem Solving Diagram</td>
<td>Best of Math I and II, Exemplars CD Everyday Mathematics Projects Everyday Mathematics</td>
</tr>
<tr>
<td></td>
<td>Observation/RSA (Recognizing Student Achievement) Test/Quiz Exit Ticket</td>
<td>Provide examples of math in &quot;real life&quot; : shopping, discounts, counting and making change, scheduling for after school events, birthday and party planning</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Evaluation of student solution using a rubric</td>
<td>Provide students with opportunities to score other students solutions using a rubric</td>
<td>Sample open-ended questions from NJ and other states Best of Math I and II Exemplars CD</td>
</tr>
</tbody>
</table>

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.
Flemington-Raritan School District

- Non-routine problems
  - Exemplars
  - EM teacher's Guide
  - Best of Math I and II, Exemplars CD
  - Open-ended responses

- Problems with multiple solutions
  - Provide opportunities for student to answer questions using the Geometer’s Template.
  - Explore open-ended questions
  - Explain It
  - Everyday Mathematics, Lesson 3.10
  - Sample Open-ended questions from NJ and other states
  - Website resources for open-ended problems

- Problems that can be solved in several ways
  - Discuss solution strategies for various open-ended problems
  - EM Activity: Fraction Problems
  - Teacher supplement
  - Best of Math I and II, Exemplars CD
  - Open-ended responses

3. Select and apply a variety of appropriate problem-solving strategies (e.g., "try a simpler problem" or "make a diagram") to solve problems.

- EM Math Journal:
  - Number Stories
  - EM activity: Finding the Area of Words
  - Best of Math I and II, Exemplars CD

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

- Provide multiple opportunities for students to solve problems using models and manipulatives
  - EM Activity: clock fractions
  - EM Activity: Pattern Block Fractions
  - Best of Math I and II, Exemplars CD
  - Sketchpad: Jeff's Garden
Flemington-Raritan School District
Mathematics Curriculum

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

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.

Provide student with opportunities to tell what they know and how they know and what they might not completely understand or are unclear on.

EM Project 5: How Would you Spend $1,000, 000? (rubric provided)

Teacher Supplement

Best of Math I and II, Exemplars CD
Teacher supplement

Discussion, listening, and questioning
Provide opportunities for students to discuss, listen and use cooperative groups and partners to share mathematically thinking

Best of Math I and II, Exemplars CD
Teacher supplement

Teacher Supplement

EM Game: First to 21

Teacher Supplement

Best of Math I and II, Exemplars CD

Teacher Supplement

Best of Math I and II, Exemplars CD
Teacher supplement

Reading and writing

Teacher Supplement

Best of Math I and II, Exemplars CD
Teacher supplement

Best of Math I and II, Exemplars CD
Teacher supplement

Teacher Supplement

Best of Math I and II, Exemplars CD
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
4. Apply mathematics in practical situations and in other disciplines.

- Convert fractions to decimals (Frac-Tac-Toe Game, Everyday Mathematics, Lesson 8.1)
- Understand the concept of area
- Practice mental math with games

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

- Investigate consumption of rice for a Thai family of four
- Explore ancient multiplication methods
- Learn about American history
- Research nonstandard units of measure
- Study the history of the Earth

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

- Understand the interplay between fractions and decimals
- Explore the relationship between geometry and algebra
- Analyze how different mathematical concepts are connected

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
5. Make and investigate mathematical conjectures.

- Counterexamples as a means of disproving conjectures
- Verifying conjectures using informal reasoning or proofs.

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

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

Provide opportunities Teacher supplement for examples and non-examples, e.g., polygon / not polygon

Exemplars I and II NJ State rubric

E. Representations

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

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

Concrete representations (e.g., base-
Fraction Factory Teacher supplement

Pictorial representations (e.g., graphs, charts
Everyday Mathematics, Unit 10
<table>
<thead>
<tr>
<th><strong>Symbolic representations (e.g., a formula)</strong></th>
<th>variables, equations</th>
<th><em>Everyday Mathematics</em>, Unit 10</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Graphical representations (e.g., a line graph)</strong></td>
<td>EM Journal</td>
<td><em>Everyday Mathematics</em>, Unit 10 Teacher supplement</td>
</tr>
</tbody>
</table>

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 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.

<table>
<thead>
<tr>
<th><strong>Students display of findings; ex. posters, charts, PowerPoint</strong></th>
<th>Place Value Puzzles Website resources Math Boxes</th>
</tr>
</thead>
</table>

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

<p>| <strong>Use Microsoft Excel</strong> | <em>Everyday Mathematics: Lesson Units 5 and 6 Teacher supplement</em> |</p>
<table>
<thead>
<tr>
<th>Task</th>
<th>Resource</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. Use graphing calculators and computer software to investigate properties of functions and their graphs.</td>
<td>Explore Microsoft Excel activities using Texas Instruments resources Teacher supplement</td>
</tr>
<tr>
<td>4. Use calculators as problem-solving tools (e.g., to explore patterns, to validate solutions).</td>
<td>Student created tessellation Explore tessellations Everyday Mathematics Lesson 3.8</td>
</tr>
<tr>
<td>5. Use computer software to make and verify conjectures about geometric objects.</td>
<td>Observation of students while interacting with software Provide appropriate opportunities for students to interact with software Geometer's Sketchpad Best of Math I and II Exemplars CD Use additional website resources as needed</td>
</tr>
<tr>
<td>6. Use computer-based laboratory technology for mathematical applications in the sciences (cf. science standards).</td>
<td>Journal writing Geometer's Sketchpad Geometer's Sketchpad</td>
</tr>
</tbody>
</table>

Flemington-Raritan School District Mathematics Curriculum
# Sixth Grade Math Pacing Guide

<table>
<thead>
<tr>
<th>Unit</th>
<th>Number of Days (approximate)</th>
<th>Unit</th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>Unit 1</strong> Data and Landmarks</td>
<td>15</td>
<td><strong>Unit 8</strong> Rates and Ratios</td>
<td>13</td>
</tr>
<tr>
<td><strong>Unit 2</strong> Operations with Whole Numbers and Decimals</td>
<td>20</td>
<td><strong>Unit 5</strong> 2 Dimensional Geometry</td>
<td>15</td>
</tr>
<tr>
<td>Metric and Customary Measurement</td>
<td>8</td>
<td>3 Dimensional Geometry</td>
<td>7</td>
</tr>
<tr>
<td><strong>Unit 3</strong> Variables, Formulas and Graphs</td>
<td>20</td>
<td><strong>Unit 6</strong> - Number Systems and Algebra Concepts</td>
<td>14</td>
</tr>
<tr>
<td>Prime Time- Factors, Multiples, and Prime Numbers</td>
<td>10</td>
<td><strong>Unit 7</strong> - Probability</td>
<td>5</td>
</tr>
<tr>
<td><strong>Unit 4</strong> Rational Number Uses and Operations</td>
<td>20</td>
<td><strong>Unit 9</strong> - Variables, Formulas and Graphs</td>
<td>10</td>
</tr>
<tr>
<td>Mid-Year Assessment</td>
<td>1</td>
<td>End-of-the-Year Assessment</td>
<td>1</td>
</tr>
</tbody>
</table>

Mid-Year Assessment

End-of-the-Year Assessment
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?

<table>
<thead>
<tr>
<th>Knowledge/Skills/Understandings</th>
<th>Assessments</th>
<th>Learning Experiences</th>
<th>Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Number Sense</td>
<td>Unit Assessments</td>
<td>Direct Instruction</td>
<td>Everyday Mathematics, Book 6- Units 2, 4, 6</td>
</tr>
<tr>
<td></td>
<td>Do Now</td>
<td>Cooperative –</td>
<td>Selected Brain Pop applications</td>
</tr>
<tr>
<td></td>
<td>Teacher</td>
<td>Collaborative Learning</td>
<td><a href="http://www.brainpop.com">www.brainpop.com</a></td>
</tr>
<tr>
<td></td>
<td>Observation</td>
<td>Experiences</td>
<td>Geometer’s Sketch Pad</td>
</tr>
<tr>
<td></td>
<td>Class Discussion</td>
<td>Written Explanations</td>
<td>New Jersey Math Frameworks 13</td>
</tr>
<tr>
<td></td>
<td>Slate Assessments</td>
<td>Open Ended Writing Tasks</td>
<td><a href="http://dimacs.rutgers.edu/njmathcoalition/framework.html">http://dimacs.rutgers.edu/njmathcoalition/framework.html</a></td>
</tr>
<tr>
<td></td>
<td>Open Ended Writing Tasks</td>
<td>Games</td>
<td>Van De Walle Chapters 9-14</td>
</tr>
<tr>
<td></td>
<td>RSA Sections of EM3</td>
<td>Geometer’s Sketch Pad</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pad -Lesson Links</td>
<td></td>
</tr>
</tbody>
</table>

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.  

Everyday Mathematics, Book 6- Unit 2  
Power of Ten-video  
Everyday Mathematics, Book 6- Unit 2  
Everyday Mathematics, Book 6- Unit 8  
Van De Walle Chapter 18  
Everyday Mathematics, Book 6- Unit 4  
Van De Walle Chapter 7
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
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 parenthesis.

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
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.
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

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.

3. Identify similar figures.

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

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

Sir Cumference and the Nights of the Round Table, Cindy Neuschwander

Everyday Mathematics, Book 6- Unit 5, 
Van De Walle Chapter 20
Groundworks Series – Geometry
Geometer’s Sketch Pad
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 (ie., a flat pattern that folds into a 3-d shape)

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

Create geometric shapes with specified properties in the first quadrant on a coordinate grid.

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.

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)

Everyday Mathematics, Book 6- Unit 9
Teacher created resources
Van De Walle Chapters 19
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?

<table>
<thead>
<tr>
<th>Knowledge/Skills/Understandings</th>
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<th>Resources</th>
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<tbody>
<tr>
<td>A. Patterns</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>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.</td>
<td>Unit Assessments</td>
<td>Direct Instruction</td>
<td>Groundworks Series ± Algebraic Reasoning, Van De Walle Chapters 22-25, Van De Walle Chapter 23</td>
</tr>
<tr>
<td></td>
<td>Do Now</td>
<td>Cooperative – Collaborative</td>
<td>Everyday Mathematics, Book 6 ± Units, 3, 6, 9 * I-R!±A&lt;rEsE6N!±AhKEPad Lesson Links</td>
</tr>
<tr>
<td></td>
<td>Teacher Observation</td>
<td>Learning Experiences</td>
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<td></td>
<td>Class Discussion</td>
<td>Written Explanations</td>
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<td>Slate Assessments</td>
<td>Open Ended Writing Tasks</td>
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<tr>
<td></td>
<td>Open Ended Writing Tasks</td>
<td>Games</td>
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<td></td>
<td>RSA Sections of EM3</td>
<td>Geometer’s Sketch Pad - Lesson Links</td>
<td></td>
</tr>
<tr>
<td>B. Functions and Relationships</td>
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<tr>
<td>1. Describe the general behavior of functions given by formulas or verbal rules</td>
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</tbody>
</table>

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. | | | |

Van De Walle Chapter 23
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](http://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, £)

   Everyday Mathematics, Book 6- – Unit 6
**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?

<table>
<thead>
<tr>
<th>Knowledge/Skills/Understandings</th>
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<th>Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Data Analysis</td>
<td></td>
<td></td>
<td><strong>Everyday Mathematics, Book 6-</strong> Unit 1</td>
</tr>
<tr>
<td>1. Collect, generate, organize, and display data; data generated from surveys.</td>
<td>Unit Assessments Do Now Teacher Observation Class Discussion Slate Assessments Open Ended Writing Tasks RSA Sections of EM3</td>
<td>Direct Instruction Cooperative – Collaborative Learning Experiences Written Explanations Open Ended Writing Tasks Games Geometer’s Sketch Pad - Lesson Links</td>
<td><strong>Navigations through Data Analysis</strong> <strong>TinkerPlots</strong> New Jersey Math Frameworks, 5, 12 <a href="http://dimacs.rutgers.edu/njmathcoalition/framework.html">http://dimacs.rutgers.edu/njmathcoalition/framework.html</a></td>
</tr>
<tr>
<td>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.</td>
<td></td>
<td></td>
<td><strong>Everyday Mathematics, Book 6-</strong> Unit 1 <strong>Navigations through Data Analysis</strong> <strong>TinkerPlots</strong> <strong>NJ ASK Coach</strong> New Jersey Math Frameworks, 5, 12, 14 <a href="http://dimacs.rutgers.edu/njmathcoalition/framework.html">http://dimacs.rutgers.edu/njmathcoalition/framework.html</a></td>
</tr>
<tr>
<td>3. Respond to questions about data, generate their own questions and hypotheses, and formulate strategies for answering their questions and testing their hypotheses.</td>
<td></td>
<td></td>
<td><strong>Everyday Mathematics, Book 6-</strong> Unit 1 <strong>Navigations through Data Analysis</strong> <strong>TinkerPlots</strong> <strong>NJ ASK Coach</strong> New Jersey Math Frameworks, 5, 12, 14 <a href="http://dimacs.rutgers.edu/njmathcoalition/framework.html">http://dimacs.rutgers.edu/njmathcoalition/framework.html</a></td>
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</table>
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.

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.
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 3x4 = 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

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).

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? Can you get from any vertex to any other vertex?
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
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
   - Everyday Mathematics, Book 6- New Jersey Math Frameworks 1-4
   - http://dimacs.rutgers.edu/njmathcoalition/framework.html
   - Explain It
   - Question Quest - Level B
   - 8 Step Model Drawing

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

4. Rely on reasoning, rather than answer keys, teachers, or peers, the 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
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.

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.

Geometer’s Sketch Pad
TinkerPlots
Geometer’s Sketch Pad Lesson Links
Brain Pop

Everyday Mathematics, Book 6 -- Unit 3
Lessons 3.7, 3.8

TI 73 and TI 82 Calculators
Everyday Mathematics, Book 6 -- Unit 3
Lessons 3.5, 3.10, 3.11

Geometer’s Sketch Pad
Geometer’s Sketch Pad Lesson Links
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.
<table>
<thead>
<tr>
<th>Unit</th>
<th>Approximate Number of Class Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data Exploration</td>
<td>30</td>
</tr>
<tr>
<td>Proportional Reasoning</td>
<td>34</td>
</tr>
<tr>
<td>Probability</td>
<td>22</td>
</tr>
<tr>
<td>Variations and Graphs</td>
<td>36</td>
</tr>
<tr>
<td>Linear Equations</td>
<td>28</td>
</tr>
<tr>
<td>Slope and Fitting a Line to Data</td>
<td>10</td>
</tr>
</tbody>
</table>
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?

<table>
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<tr>
<td><strong>A. Number Sense</strong></td>
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<tr>
<td>1. Extend understanding of the number system by constructing meanings for the following <strong>(unless otherwise noted, all indicators for grade 8 pertain to these sets of numbers as well)</strong>: Rational numbers; Percents; Exponents; Roots; Absolute Values; Numbers represented in scientific notation</td>
<td>Unit Assessments Do Now Teacher Observation Discussion Investigation Results Open Ended Writing Tasks</td>
<td>Direct Instruction Collaborative and Cooperative Learning Open Ended Writing Tasks Tinkerplots Software Geometer's Sketchpad Software Lesson Investigations Investigate decimal patterns using calculator</td>
<td><em>Discovering Algebra</em> Chapters 2, 4 <em>UCSMP Transitions</em></td>
</tr>
</tbody>
</table>

| 2. Demonstrate a sense of the relative magnitudes of numbers. | Number line graphing Lesson Investigations throughout the textbook | *Discovering Algebra* 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, *Discovering Algebra* Chapters 2, 3 3.1, 3.2, 3.3 | |
| 4. Compare and order numbers of all named types. | Lesson Investigation 2.2 | *Discovering Algebra* Chapters 1,2 |
| 5. Use whole numbers, fractions, decimals, and percents to represent equivalent forms of the same number. | Lesson Investigation 2.1 | *Discovering Algebra* Chapter 2 |
Flemington-Raritan School District

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

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

1. Use equivalent representations of numbers such as fractions, decimals, and percents to facilitate estimation. Lesson Investigation 4.1 Ongoing throughout chapter investigations

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
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

2. Understand and apply the concept of similarity: Using proportions to find missing measures; scale drawings; models of 3D objects

3. Use logic and reasoning to make and support conjectures about geometric objects.

**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

**Unit Assessments**

- Do Now
- Teacher Observation
- Discussion
- Investigation Results
- Open Ended Writing Tasks

**Learning Experiences**

- Direct Instruction
- Collaborative and Cooperative Learning
- Open Ended Writing Tasks
- Tinkerplots Software
- Geometer’s Sketchpad Software
- Lesson Investigations

**Resources**

- Geometer’s Sketchpad
- Geometer’s Sketchpad Lesson Links
- Discovering Algebra Chapter 3
- Discovering Algebra Chapter 3
- Geometer’s Sketchpad
- Geometer’s Sketchpad Lesson Links
- NJ ASK Coach

**Manipulatives**

- Geometer’s Sketchpad
- Geometer’s Sketchpad Lesson Links
(stretching /shrinking) result in images similar
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
   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

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 standard and metric systems to estimate measurements.

3. Select and use appropriate units and tools to measure quantities to the degree of precision needed in a particular problem-solving situation.

4. Recognize that all measurements of continuous quantities are approximations.
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).

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

2. Recognize that the volume of a pyramid or cone is 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.
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?

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<td><strong>A. Patterns</strong></td>
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<tr>
<td>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.</td>
<td>Unit Assessments, Do Now, Teacher Observation, Discussion, Investigation Results, Open Ended Writing Tasks</td>
<td>Direct Instruction, Lesson Investigation 4.3, 4.4, 4.6, Modeling, Graphing Calculators</td>
<td>Discovering Algebra Chapter 4</td>
</tr>
<tr>
<td><strong>B. Functions and Relationships</strong></td>
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</tr>
<tr>
<td>1. Graph functions, and understand and describe their general behavior: Equations involving two variables; Rates of change (informal notion of slope).</td>
<td>Lesson Investigations 4.4, 4.6, 4.7, 5.1, 5.1, 5.2, 5.3</td>
<td>Direct Instruction, Lesson Investigations 4.4, 4.6, 4.7, 5.1, 5.1, 5.2, 5.3</td>
<td>Discovering Algebra Chapters 4 and 5</td>
</tr>
<tr>
<td><strong>C. Modeling</strong></td>
<td></td>
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</tr>
<tr>
<td>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.</td>
<td>Lesson Investigations 3.2, 4.3, 4.4, 4.6, 4.7, 5.1, 5.2, 5.3</td>
<td>Direct Instruction, Lesson Investigations 3.2, 4.3, 4.4, 4.6, 4.7, 5.1, 5.2, 5.3</td>
<td>Discovering Algebra Chapters 3, 4, 5</td>
</tr>
</tbody>
</table>
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)

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"

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.

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 Investigations 3.2, 4.3, 4.4, 4.6, 4.7, 5.1, 5.2, 5.3

Discovering Algebra Chapters 3, 4, 5

Pre-Algebra with Pizzazz Lesson Investigations 3.2, 4.3, 4.4, 4.6, 4.7, 5.1, 5.2, 5.3

Discovering Algebra Chapters 2, 3, 4

Lesson Investigation 4.1

Discovering Algebra Chapters 2, 3, 4

Pre-Algebra with Pizzazz

Geometer's Sketchpad Lesson Links

Discovering Algebra Chapters 2, 3, 4

Discovering Algebra

Pre-Algebra with Pizzazz
5. Understand and apply the properties of operations, numbers, equations, and inequalities: Additive inverse; Multiplicative inverse; addition and multiplication properties of equality
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

<table>
<thead>
<tr>
<th>Knowledge/Skills/Understandings</th>
<th>Assessments</th>
<th>Learning Experiences</th>
<th>Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. Data Analysis</strong></td>
<td>Unit Assessments</td>
<td>Direct Instruction</td>
<td>Discovering Algebra Chapter 1</td>
</tr>
<tr>
<td>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</td>
<td>Do Now Teacher Observation Discussion Investigation Results Open Ended Writing Tasks</td>
<td>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</td>
<td>TinkerPlots</td>
</tr>
<tr>
<td>2. Make inferences and formulate and evaluate arguments based on displays and analysis of data.</td>
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<tr>
<td>3. Estimate lines of best fit and use them to interpolate within the range of data</td>
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</tbody>
</table>

### B. Probability

1. Interpret probabilities as ratios, percents, and decimals.

<table>
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<tr>
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</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lesson Investigations 1.1-1.7</td>
<td>Discovering Algebra Chapter 1 TinkerPlots</td>
</tr>
<tr>
<td></td>
<td>Lesson Investigation 5.3</td>
<td>Discovering Algebra Chapter 5</td>
</tr>
<tr>
<td></td>
<td>Lesson Investigations 2.6, 2.7</td>
<td>Discovering Algebra Chapter 2 Connected Mathematics “What Do You Expect” Math With Pizzazz Book E Pre Algebra with Pizzazz</td>
</tr>
</tbody>
</table>
2. Model situations involving probability with simulations (using spinners, dice, calculators and computers) and theoretical models: Frequency, relative frequency.

3. Estimate probabilities and make predictions based on experimental and theoretical probabilities.

4. Play and analyze probability-based games, and discuss the concepts of fairness and expected value.

C. Discrete Mathematics - Systematic Listing and Counting

1. Apply the multiplication principle of counting: permutations; ordered situations with replacement vs. ordered situations without replacement.

2. Explore counting problems involving Venn diagrams with three attributes

3. Apply techniques of systematic listing, counting, and reasoning in a variety of different contexts.
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 form 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
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

   - Discovering Algebra
   - New Jersey Math Frameworks 1-4
   - [http://dimacs.rutgers.edu/njmmathcoalition/framework.html](http://dimacs.rutgers.edu/njmmathcoalition/framework.html)
   - Explain It
   - Question Quest: Level B
   - 8 Step Model Drawing

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

4. Rely on reasoning, rather than answer keys, teachers, or peers, the 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](http://dimacs.rutgers.edu/njmathcoalition/framework.html)

*Explain It*

*Question Quest. Level B*

*8 Step Model Drawing*
1. Use technology to gather, analyze, and communicate mathematical information.

2. Use computer spreadsheets, software, and graphing utilities to organize and display quantitative information.

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.

Geometer’s Sketch Pad
TinkerPlots

Geometer’s Sketch Pad Lesson Links
Brain Pop

Discovering Algebra Chapter 1
Geometer’s Sketchpad Lesson Links
Geometer’s Sketchpad
Tinker Plots

TI 73 and TI 84 Calculators
Discovering Algebra – Chapters 1-5

Discovering Algebra – Chapters 1-5

Geometer’s Sketch Pad
Geometer’s Sketch Pad Lesson Links
Tinker Plots

Discovering Algebra – Chapters 1-5
Geometer’s Sketch Pad
Geometer’s Sketch Pad Lesson Links
Tinker Plots
<table>
<thead>
<tr>
<th>Unit</th>
<th>Number of Days (Approximate)</th>
<th>Unit</th>
<th>Number of Days (Approximate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 . Naming &amp; Constructing Geometric Figures</td>
<td>12</td>
<td>7 . Fractions &amp; Their Uses, Probability</td>
<td>17</td>
</tr>
<tr>
<td>2 . Using Numbers &amp; Organizing Data</td>
<td>13</td>
<td>8 . Perimeter &amp; Area</td>
<td>11</td>
</tr>
<tr>
<td>Number Sentences &amp; Algebra</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 . Decimals &amp; Their Uses</td>
<td>14</td>
<td>10 . Reflections &amp; Symmetry</td>
<td>10</td>
</tr>
<tr>
<td>5 . Big Numbers; Estimation &amp; Computation</td>
<td>14</td>
<td>11 . 3-D Shapes, Weight, Volume, &amp; Capacity</td>
<td>10</td>
</tr>
<tr>
<td>6 . Division, Map Reference, Measure of Angles</td>
<td>13</td>
<td>12 - Rates</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hands on Algebra</td>
<td>5</td>
</tr>
</tbody>
</table>
### 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

#### 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).

   - Whole numbers through millions
     - Teacher observation
     - Teacher play with student
     - Do Now: SL.2.3
     - Unit 7 W-Up Quiz and *Everyday Mathematics* assessment 7.13
     - Metric Model Class Project 1-Million (picture) SP 134 & 135
     - *Everyday Mathematics* Unit 7
     - MB Fraction Kit, Circle Fractions
     - Decimal Quiz Sheet # 2
     - Decimal Factory, Decimal Model (picture) SL. 4.1
     - *Everyday Mathematics* 2.3 & 2.4
     - Decimal Do Now Sheet #27
     - *Everyday Mathematics* 4.3, SRB p. 24 Game: Smaller to Larger
     - SL 4.9
     - Sheet #38

   - 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
     - Adjusting the Activity
     - *Everyday Mathematics* 2.3 & 2.4
     - Decimal Do Now Sheet #27
     - Sheet #38

   - Decimals through hundredths
     - Decimal Quiz Sheet # 2
     - Decimal Factory, Decimal Model (picture) SL. 4.1

2. Demonstrate an understanding of place value concepts.

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

   - Adjusting the Activity
   - *Everyday Mathematics* 4.3, SRB p. 24 Game: Smaller to Larger
   - SL 4.9
   - Ordering and Comparing Decimals
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.

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.

- Temperatures below zero degrees, debts
- Extension of the number line

Create a number sentence sheet #13

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.

- Addition and subtraction: joining, separating, comparing
- Multiplication: repeated addition, area/array
- Division: repeated subtraction, sharing

Teacher observes and checks off on class recording sheet reasoning, justifying, listen to partner

Frame Fun Cooperative cards
24 Game Tiguous Sheet # 6

Everyday Mathematics 2.7 & 2.9
Games: Rio, Four in a Row, The Winning Touch

Multiplication Games, Kamii & Anderson
Teaching Children Math, November 2003

Math Homework that Counts, A. Raphel
Math Solutions 2000

SL. 3.7
Teacher observation

Literature. Link:
Things That Come in Groups
Class Project

What Comes in 2's, 3's, 4's?, Suzanne Aker, Simon & Schuster, 1990

Math by All Means Mult. 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.

- Multiplication of 2-digit numbers
- Division of 3-digit numbers by 1-digit numbers

Teacher observation

Group solutions
Recorded by teacher
Individual paper & pencil
Multiplication Quiz Sheet # 3
Jack Had 14 Scoops # 5
Beans & Scoops # 15

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

Pathways
JP 125 & 8 & 9, 131 SL 5.7
Lesson 3.1-3.4

MB lesson from VIDEO using
Base 10 Blocks

Math Literature (4-b), Rusty Bresser, Math Solutions, 1995


Mathematics: Teaching for Understanding Video in Robert Hunter Library
Flemington-Raritan School District  
Mathematics Curriculum  

| Performance task: Write riddle. Exchange with partner and solve | Leftovers sheet # 17 | A Remainder of One, E.J. Pin czes (From Math & Literature. 4-6),  
| Everyday Mathematics 6.11 Unit 6 Warm-up Quiz Journal paragraph | Roll 15 | Writing in Math Class, M. Burns, Math Solutions, 1995 |  
| | Literature. Link: Remainder Riddles | | 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  
   Game: Name That Number SRB p. 188  

   Everyday Math 2.7 & 2.9  
   Teacher observation of students  
   Game: Subtraction Target  

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  


6. Count and perform simple computations with money.  
   - Standard dollars and cents notation  

   Which Would You Rather Have... Sheet # 12  
   Literature Link: The Lunch Line  
   www.mathsolutions.com  
   Past Issues Fall/Winter 2000/01  
   Making Change for 20¢
### Flemington-Raritan School District
Mathematics Curriculum

<table>
<thead>
<tr>
<th>Portfolio Prompts</th>
<th>Everyday Mathematics 9.10 Unit 9 Warm-up Quiz Slates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual interview</td>
<td>Write number stories, exchange and solve</td>
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<tr>
<td></td>
<td>Write and solve place value puzzles</td>
</tr>
<tr>
<td></td>
<td>Describe a problem solving strategy</td>
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#### 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
- What I Know About Percents (so far)
- Big Idea:
  - Another name for Hundredth Models that connect fractions, decimals, percents

#### Individual writing assignment
- What I Know About Percents (so far)

- 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
- JP 123 SL 5.4
- Fraction Kit

#### Fraction Problems Att # 25
- Fraction Factory
- Pattern Blocks
- Cuisenaire Rods Sheet # 21
- Fractions with Cookies # 22
- Sharing Brownies # 22
- Which Would You Rather Have # 12

#### 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

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

#### Everyday Mathematics 6.3
- Observe and play with students
- Chip Trading Sheet # 37

8. Check the reasonableness of results of computations.

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

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

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

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

- Slates
- Quick flashes on overhead
- Journal Entry
- Beans and Scoops Investigation
- Lessons for Extending Multiplication, Wickett & Burns, Math Solutions, 2001
- About Teaching Mathematics, Marilyn Burns, Math Solutions, 2000
- Journal Prompt: If I were 1 cm tall....
- Literature Link: How Big is a Foot?
- Author: Rolf Myller, Dell Yerling, 1990
- Everyday Mathematics 5.12 Unit 5 Warm-up Quiz
- Everyday Mathematics 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?

<table>
<thead>
<tr>
<th>Knowledge/Skills/Understandings</th>
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<th>Resources</th>
</tr>
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<tbody>
<tr>
<td>A. Geometric Properties</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Identify and describe spatial relationships of two or more objects in space.</td>
<td>Hand out packet</td>
<td>Everyday Mathematics Project 6: Building &amp; Viewing Structures Cuisenaire Rods: Front, top, side views</td>
<td>Spatial Problem Solving with Cuisenaire Rods, Davidson &amp; Willett, ETA/Cuisenaire, 2002</td>
</tr>
<tr>
<td>● Direction, orientation, and perspectives (e.g., which object is on your left when you are standing here?)</td>
<td>Observation of vocabulary</td>
<td>Polygon Tiles</td>
<td>Super Source CD Rom video clip # 20</td>
</tr>
<tr>
<td>● Relative shapes and sizes</td>
<td>Students create poster comparing faces of 2 different solids</td>
<td>Geoboard shape sorting: Polygons are...</td>
<td></td>
</tr>
<tr>
<td>● Shadows (projections) of everyday objects</td>
<td>Everyday Mathematics Assessment 11 .8 Unit 22 Warm-up Quiz</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Use properties of standard three-dimensional and two-dimensional shapes to identify, classify, and describe them.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>● Vertex, edge, face, side, angle</td>
<td></td>
<td>Geometric solids and their parts</td>
<td>TERC: Containers and Cubes, Dale Seymour Publishing, 1998</td>
</tr>
<tr>
<td>● 3D figures -- cube, rectangular prism, sphere, cone, cylinder, and pyramid</td>
<td></td>
<td>12 Wooden shapes -- Nets -- Pentominos</td>
<td>The Greedy Triangle, Marilyn Burns, Math Solutions 1994</td>
</tr>
<tr>
<td>● 2D figures -- square, rectangle, circle, triangle, quadrilateral, pentagon, hexagon, octagon</td>
<td></td>
<td>Literature Link: The Greedy Triangle Polydron Tiles -- students construct 3D solids Polygon Tiles -- students identify 2D shapes Roping in Quadrilaterals with Applet: Mystery Rings</td>
<td></td>
</tr>
<tr>
<td>● Inclusive relationships -- squares are rectangles, cubes are rectangular prisms</td>
<td></td>
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</tr>
</tbody>
</table>

Everyday Mathematics
Polygon Riddles
Geometry riddles sheet # 11

NCTM Navigations Geometry 3-5
Everyday Mathematics 6.6 - 6.10
Applets: Mirror Tool: reflections, slides, flips, turns
Applets: Cutting Corners Tool
Applets: Two Geoboards
Everyday Mathematics
Unit 11

3. Identify and describe relationships among 2D shapes.
   - Congruence
   - Lines of symmetry

4. Understand and apply concepts involving lines, angles, and circles.
   - Point, line, line segment, endpoint
   - Parallel, perpendicular
   - Angles -- acute, right, obtuse
   - Circles -- diameter, radius, center

Everyday Mathematics Assessment 10.7
Unit 10 Warm-up Quiz
Time to Reflect

Everyday Mathematics Assessment 1.9
Unit 1 Warm-up Quiz
Time to Reflect
Tangrams sheet # 9

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

B. Transforming Shapes
1. Use simple shapes to cover an area (tessellations).

Everyday Mathematics Unit 1
Notes from class: Vocabulary presented by teacher using overhead and picture poster
Students copy, discuss, ask questions.
Construct angles with Geostrips

NCTM Addenda Series Grades 5-8, 1992
Navigations: Geometry 3-5, Applet

Share and Compare, Larry Bushman, NCTM, 2003, p. 52

Students build patterns with Pattern Blocks
Students informally create tessellations with Pattern Blocks
2. Describe and use geometric transformations (slide, flip, turn).

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.

**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.
Flemington-Raritan School District
Mathematics Curriculum

- Length -- fractions of an inch (1/8, 1/4, 1/2), mile, decimeter, kilometer
- Area -- square inch, square centimeter
- Capacity -- fluid ounce, cup, gallon, milliliter
- Solve problems involving elapsed time

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
Prompt: I used the _____ benchmark to measure _____.

How good is your estimate?
Measurement day: Estimation Fair
Estimating Lengths with Benchmarks

E. Measuring Geometric Objects

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

Everyday Mathematics 8.9 Assessment
Unit 8 Warm-up Quiz

2. Distinguish between perimeter and area and use each appropriately in problem-solving situations.

Everyday Mathematics 8.1-8.8
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
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.

- Descriptions using words, number sentences/expressions, graphs, tables, variables (e.g., shape, blank, or letter)
- Sequences that stop or that continue infinitely
- 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,...)
- 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...)

Math Master p. 163
Frieze Patterns Everyday Mathematics 10.5
SRB p.94

Students complete worksheets and present a solution at overhead.
Hands On Algebra book I
I Spy Patterns
Algebra Scales
Math Congress: pairs of students present poster to classmates
The Variable Machine
Hundred Board Wonders
Function Machine & Pan Balance
Applets
Patterns that grow: Patterns on charts with online calculator
Number Patterns
It All Adds Up!

www.borenson.com
Navigations through Algebra 3-5
Navigations through Algebra 3-5
NCTM.org.Illuminations - lesson
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.
Flemington-Raritan School District
Mathematics Curriculum

- Input/output table, T-charts

- Combining two function machines
- Reversing a function machine

Everyday Mathematics
What's my rule? JP 59 & 64 (Mbox)

Rate Tables 12.2

Completion of Blackline Masters

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

   Class graph

   Everyday Mathematics 2.8 9.6

   Grow and measure Amaryllis Bulb.
   Help students focus on the shape of the data: range, maximum, minimum, outlier

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

   - 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 x 6 = ______, n = 15 ÷ 3, 3 x _____ = 0, 16 - c = 7).

   Whole class discussion
   Number Balance
   Van De Walle, p. 428

   Manual p. 191

   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

D. Procedures

1. Understand and use the concepts of equals, less than, and greater than in simple number sentences.
   - Symbols ( =, <, >)
   - Students share posters in Math Congress
   - Journal paragraph: What I know now about =, <, and >
   - Equality, relational thinking
   - True, false, and open number sentences

2. Understand, name, and apply the properties of operations and numbers.
   - Commutative (e.g., 3 × 7 = 7 × 3)
   - Identity element for multiplication is 1 (e.g., 1 × 8 = 8)
   - NFC: Big Ideas
   - Class Discussion: a + b - b = a
   - k + k + 13 = k + 20
   - 56 + 75 + 25 = _____
   - Meanings for Operations
   - Multiplication and Division Properties
   - The Broken Multiplication Key
   - The Broken Division Key
   - Representing Conjectures Symbolically
   - Ordering multiple operations
   - Van De Walle p. 135
   - Van De Walle p. 149 & 150

- Division by zero is undefined
- Any number multiplied by zero is zero

www.mathsolutions.com Past Issues Fall 2002
### Flemington-Raritan School District

**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?

<table>
<thead>
<tr>
<th>Knowledge/Skills/Understandings</th>
<th>Assessments</th>
<th>Learning Experiences</th>
<th>Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. Data Analysis</strong></td>
<td>SL 2.6</td>
<td>Everyday Mathematics 2.5, 2.6, &amp; 2.8</td>
<td>NCTM Navigations through Data Analysis and Probability, 3-5, 2002</td>
</tr>
<tr>
<td>1. Collect, generate, organize, and display data in response to questions, claims, or curiosity.</td>
<td>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?</td>
<td>Enrichment: Bulletin Board Display Above number line - Adults head circumference Below number line - 3rd grade head circumference</td>
<td>Questions Please? SRB p. 63 Roll 15 game sheet # 15</td>
</tr>
<tr>
<td>- Data generated from the school environment</td>
<td></td>
<td></td>
<td>NCTM.org - lesson Names First What's in a name? Lesson: First Names First Finding the Balance Point Van De Walle p. 401</td>
</tr>
<tr>
<td>2. Read, interpret, select, construct, analyze, generate questions about, and draw inferences from displays of data.</td>
<td>Notes from Class BIG Ideas</td>
<td>Everyday Mathematics 2.10 Unit 2 Warm-up</td>
<td>Van De Walle p. 386</td>
</tr>
<tr>
<td>- Pictograph, bar graph, line plot, line graph, table</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### B. Probability

1. Use everyday events and chance devices, such as dice, coins, and unevenly divided spinners, to explore concepts of probability
   - 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
   - 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
   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).
   - What students think will happen (intuitive)
   - Collect data and use that data to predict the probability (experimental)
   - Analyze all possible outcomes to find the probability (theoretical)

   Journal prompts
   Color Tile Sampling
   Roll 2 dice
   Tiles in Three Bags
   Pigs, testing pig strategies
   Matching line plots with spinners
   Is there such a thing as a lucky coin?
   Spin City
   Is it fair?

   Observation of students
   Applets:
   Preset Spinner
   Dice Sums
   Coin Toss

   NCTM Navigating through Data Analysis and Probability 3-5
   NCTM Navigating through Data Analysis and Probability 3-5
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
   - Exit slip: I played ____ today. I liked ____.
     - 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.
   - Class discussion to create class chart: Combinations: Shorts and Skirts, Ice Cream cones, Cooperative Logic
   - Ticket out the door: Squares in a square with color tiles
   - 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)

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.
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?

<table>
<thead>
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<tbody>
<tr>
<td>A. Problem Solving</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Learn mathematics through problem solving inquiry and discovery</td>
<td>Observe pairs playing/play with a student</td>
<td>Picture This</td>
<td>NCTM.org. Illuminations - lessons</td>
</tr>
<tr>
<td></td>
<td>Journal: work with partner, report your answer, and how you figured it out</td>
<td>A Long Division Activity</td>
<td></td>
</tr>
<tr>
<td>2. Solve problems that arise in mathematics and in other contexts</td>
<td>Teacher observation</td>
<td>Match or No Match</td>
<td></td>
</tr>
<tr>
<td>● Open ended problems</td>
<td>Students share and teacher records on a class chart</td>
<td>24 Game</td>
<td>Problem Solving Lessons, Marilyn Burns, Math Solutions, 1996</td>
</tr>
<tr>
<td>● Non-routine problems</td>
<td>Teacher collects papers and responds with post-it &quot;nudge notes&quot;</td>
<td>Julia's Dartboard sheet # 29</td>
<td>Young Children Reinhert Arithmetic, Kamii &amp; Housman, Teachers College Press, 2000</td>
</tr>
<tr>
<td>● Problems with multiple solutions</td>
<td>Check your understanding</td>
<td>Poyla activity: Cows &amp; Chickens sheet # 30</td>
<td>NJ Curriculum Framework grade 3-4 Standard 1: Problem Solving</td>
</tr>
<tr>
<td>● Problems that can be solved in several ways</td>
<td></td>
<td>SRB p. 149</td>
<td></td>
</tr>
</tbody>
</table>
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
   Lesson: Every Breath You Take

   Completion of worksheet
   Literature Link: A Tale of Two Stories: Pigging Out
   Mathematics and Children's Literature: Getting the Facts: Counting on Frank

   Collect and respond with post-it "nudge note"
   Explain to a student in 2nd grade what you learned about decimals today

   Class discussion
   Even/Odd Class Discussion

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

   Class discussion
   Everyday Mathematics lesson 3.7-3.10

   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

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

   Parent Volunteers
   Best of Math Exemplars II CD Rom
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.

D. Reasoning

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

Exit slip

Exploration of a Balance Lesson:
Maintaining the Balance
Shifting the Balance

Completion of worksheet Games, Measurement, and Statistics Lesson:
Pitching Cards

Students create a class book of their own

Literature Link: Only One
Literature Link: The Important Book

Everyday Mathematics Assessment 12.7
Unit 12 Warm-up Quiz

Everyday Mathematics Rates 12.1 - 12.5

Everyday Mathematics Project 7: Numbers Maya Style

only one, harshman, coblehill books, 1993 the important book, wise brown, harper collins, 1949
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, the 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.

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### Flemington-Raritan School District Mathematics Curriculum

<table>
<thead>
<tr>
<th>Activity</th>
<th>Description</th>
<th>Resource Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completion of worksheet followed by class discussion</td>
<td>Numbers and Language Lesson: Post Office Numbers</td>
<td>NCTM.org, Illuminations -lesson</td>
</tr>
<tr>
<td>Class Brainstorm: can we find all possible combinations?</td>
<td>Possible Solution Sets Lesson: Create an Address Number</td>
<td></td>
</tr>
<tr>
<td>Partners create organized list of all possible combinations</td>
<td>Build the Yellow Hexagon</td>
<td>Super Source CD Rom Video Clip # 2, Cuisenaire Co., 1996</td>
</tr>
<tr>
<td>Journal prompt: I used the strategy of ____ to guess the sequence of colors.</td>
<td>The Last Block with Pattern Blocks</td>
<td>Super Source CD Rom lesson, Cuisenaire Co., 1996, p. 62</td>
</tr>
<tr>
<td>Be a Logician with Color Tiles</td>
<td>Writing Prompt sheet # 31</td>
<td>Super Source CD Rom lesson, Cuisenaire Co., 1996, p. 18</td>
</tr>
<tr>
<td></td>
<td>Writing Prompt sheet # 36</td>
<td>NCTM 2001 Yearbook: Promoting the Use of Diagrams as Tools for Thinking, pp. 77-89</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NCTM 1999 Yearbook: Reasoning About Operations, pp. 62-81</td>
</tr>
</tbody>
</table>
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)

   Students share at overhead
   Students create graphs using spreadsheet
   Whole class discussion
   Math congress
   Writing Prompt: Reflection on playing the game

   Problem: What happens to the area of a rectangle if the lengths of its sides are doubled?
   Collecting, Representing, and Interpreting Data
   Are there more even or odd products in the multiplication table?
   Problem Prompts adaptations
   Chip Trading

   Principles and Standards for School Mathematics, NCTM, 2000, p. 205
   Principles and Standards for School Mathematics, NCTM, 2000, E - example 5.5 (members only)
   Principles and Standards for School Mathematics, NCTM, 2000, pp. 208-9
   NCTM 2001 Yearbook, pp. 77-89
   NCTM On-Math Journal, Spring 2003, (members only), Printed copy of article attached.

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
   Applets: Patterns
   Shape Tool (Illuminations)
   Math Congress/class discussion
   Problem of the week
   Math Arena
   http://mathforum.org
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).
## 4th Grade Gifted and Talented Pacing Guide

<table>
<thead>
<tr>
<th>Unit</th>
<th>Number of Days (Approximate)</th>
<th>Unit</th>
<th>Number of Days (Approximate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Number Theory</td>
<td>13</td>
<td>7. Exponents and Negative Numbers</td>
<td>14</td>
</tr>
<tr>
<td>2. Estimation and Computation</td>
<td>13</td>
<td>8. Fractions and Ratio</td>
<td>16</td>
</tr>
<tr>
<td>4. Division</td>
<td>10</td>
<td><strong>Hands On Equations</strong></td>
<td>10</td>
</tr>
<tr>
<td>5. Fractions, Decimals, and Percent</td>
<td>15</td>
<td>10. Using Data; Algebra Concepts and Skills</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td></td>
<td>12. Probability, Ratio, and Rates</td>
<td>11</td>
</tr>
<tr>
<td>Mid-Year Benchmark Assessment</td>
<td>1</td>
<td>End-of-the-Year Benchmark Assessment</td>
<td>1</td>
</tr>
</tbody>
</table>
### 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  
**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).*

<table>
<thead>
<tr>
<th>Assessments</th>
<th>Learning Experiences</th>
<th>Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher observation</td>
<td>Practice Master pm 5-41, 5-82</td>
<td>Open Court, 1991</td>
</tr>
<tr>
<td>Teacher made exit slips</td>
<td>Pizzazz, E-61</td>
<td>Everyday Mathematics Units</td>
</tr>
<tr>
<td>(attachment 3)</td>
<td>&quot;Pattern Blocks&quot;</td>
<td>5, 6, and 8</td>
</tr>
<tr>
<td>&quot;Fraction Track&quot;</td>
<td>Variety of Games</td>
<td>Name That Portion, TERC, 1996</td>
</tr>
<tr>
<td>&quot;Geoboard Puzzles&quot;</td>
<td></td>
<td>Middle School with Pizzazz, Booke</td>
</tr>
<tr>
<td>&quot;Geoboard Puzzles&quot;</td>
<td></td>
<td>Teaching Children Mathematics, Janet Caldwell, November 1995</td>
</tr>
</tbody>
</table>

- Whole numbers through millions  
- Student journals  
- Whole Class Discussion  
- "Fraction Track"  
- "Geoboard Puzzles"

- 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
2. Demonstrate an understanding of place value concepts.

3. Recognize the decimal nature of United States currency and compute with money.

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

5. Use whole numbers, fractions, and decimals to represent equivalent forms of the same number.

6. Develop and apply number theory concepts in problem solving situations.

- Primes, factors, multiples
6. Compare and order numbers.

B. Numerical Operations

1. Recognize the appropriate use of each arithmetic operation in problem situations.
   - Everyday Mathematics Unit 2 Assessment
   - Everyday Mathematics Unit 4 Assessment
   - Everyday Mathematics Unit 5 Assessment

2. Construct, use, and explain procedures for performing addition and subtraction with fractions and decimals with:
   - Pencil-and-paper
   - Mental math
   - Calculator
   - Middle School with Pizzazz
   - Crossmatics, Dudley, 1990

3. Use an efficient and accurate pencil-and-paper procedure for division of a 3-digit number by a 2-digit number.
   - Everyday Mathematics Unit 4 Assessment
   - Math Congress
   - Notes from class
   - Small group work
   - 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
   - Everyday Mathematics - 5 Unit 4
   - Everyday Mathematics - 5 Units 2, 4, 5, 6, 8
   - Project 3

- Whole Class Division Review
5. Check the reasonableness of results of computations. 

6. Understand and use the various relationships among operations and properties of operations.

C. Estimation

1. Use a variety of estimation strategies for both number and computation.

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.
### 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?

<table>
<thead>
<tr>
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</tr>
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<tbody>
<tr>
<td><strong>A. Geometric Properties</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Understand and apply concepts involving lines and angles.</td>
<td>Everyday Mathematics Unit 3 Assessment</td>
<td></td>
<td>Everyday Mathematics - 5 Unit 3 Assessment</td>
</tr>
<tr>
<td>• Notation for line, ray, angle, line segment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Properties of parallel, perpendicular, and intersecting lines</td>
<td></td>
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</tr>
<tr>
<td>• Sum of the measures of the interior angles of a triangle is 180°</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Identify, describe, compare, &amp; classify polygons.</td>
<td>Everyday Mathematics Unit 3 Assessment</td>
<td>&quot;Polygon Capture&quot; &quot;Geodeo's Sorting Scheme&quot;</td>
<td>Everyday Mathematics - 5 Unit 3</td>
</tr>
<tr>
<td>• Triangles by angles &amp; sides</td>
<td></td>
<td></td>
<td>Navigation through Geometry in Grades 6-8, 2001</td>
</tr>
<tr>
<td>• Quadrilaterals, including squares, rectangles, parallelograms, trapezoids, rhombi</td>
<td></td>
<td></td>
<td>The Greedy Triangle, Marilyn Burns, 1994</td>
</tr>
<tr>
<td>• Polygons by number of sides</td>
<td></td>
<td></td>
<td>Geometry in the Middle Grades (6-8), Illuminations</td>
</tr>
<tr>
<td>• Equilateral, equiangular, regular</td>
<td></td>
<td></td>
<td>Geoshapes (games), Talicor, 1996</td>
</tr>
<tr>
<td>• All points equidistant from a given point form a circle</td>
<td></td>
<td>&quot;Geoshapes&quot;</td>
<td></td>
</tr>
<tr>
<td>3. Identify similar figures.</td>
<td>Everyday Mathematics Unit 3 Assessment</td>
<td></td>
<td>Everyday Mathematics - 5 Unit 3 Assessment</td>
</tr>
</tbody>
</table>
## 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"

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 6
   - Tools, Illuminations
   - "Tessellemania CD Rom"

## C. Coordinate Geometry

1. Create geometric shapes with specified properties in the first quadrant on a coordinate grid.

   **Everyday Mathematics Unit 9 Assessment**
   - "Battleship" game
   - "Hurkle" game
   - "Lost in the Crowd" Math Arena Activity

## 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 - 5 Unit 9
   - "Hurkle" *Family Math*, 1986
   - *Math Arena*, 1994

   **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).

3. Know approximate equivalents between the standard and metric systems (e.g., one kilometer is approximately 6/10 of a mile).

4. Use measurements and estimates to describe and compare phenomena.

E. Measuring Geometric Objects

1. Use a protractor to measure angles.

   E v e r y d a y  M a t h e m a t i c s  U n i t  3
   Assessment

   PM 5-67
   "Mrs. Claus" D-26

1. Develop and apply strategies and formulas for finding perimeter and area.
   - Square
   - Rectangle

3. Recognize that rectangles with the same perimeter do not necessarily have the same area and vice versa.

   Everyday Mathematics - 5 Units 9 & 11
   Open Court, 1991
   Middle School with Pizzazz

   Project 7 - Everyday Mathematics
   Everyday Mathematics Unit 9
   About Teaching Mathematics, Marilyn Burns

   "The Perimeter Stays the Same"
   "Perimeter with Cuisenaire Rods"
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?

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<tbody>
<tr>
<td><strong>A. Patterns</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Recognize, describe, extend, and create patterns involving whole numbers.</td>
<td>Unit 10 Assessment</td>
<td>Everyday Mathematics - 5</td>
<td>Everyday Mathematics - 5 Units 1, 2, 7, 10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Everyday Mathematics - The Four 4's Project</td>
<td>Everyday Mathematics - 5 Unit 7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unit 10 Assessment</td>
<td>Everyday Mathematics - 5 Unit 9</td>
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<td>Unit 10 Assessment</td>
<td>Everyday Mathematics - 5 Unit 10 (Lessons 4 &amp; 6)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Student completion of booklet.</td>
<td>First to 100 - Everyday Mathematics</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Student demonstration</td>
<td>Hands on Algebra</td>
</tr>
<tr>
<td><strong>B. Functions &amp; Relationships</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Describe arithmetic operations as functions, including combining operations and reversing them.</td>
<td>Unit 7 Assessment</td>
<td>Everyday Mathematics - 5</td>
<td>Everyday Mathematics - 5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Everyday Mathematics - 5 Unit 7</td>
<td>Everyday Mathematics - 5 Unit 9</td>
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<td>Unit 10 Assessment</td>
<td>Everyday Mathematics - 5 Unit 10 (Lessons 4 &amp; 6)</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>Student demonstration</td>
<td>Hands on Algebra</td>
</tr>
<tr>
<td><strong>C. Modeling</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Use number sentences to model situations.</td>
<td>Circulate, complete, and share Journal p. 360</td>
<td>Everyday Mathematics 10.5 - Predicting Old Faithful's Next Eruption</td>
<td>Everyday Mathematics - Unit 10 Lesson 5</td>
</tr>
<tr>
<td>- Using variables to represent unknown quantities</td>
<td></td>
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<tr>
<td>- Using concrete materials, tables, graphs, verbal rules, algebraic expressions/equations</td>
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</tbody>
</table>
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*
## 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

### A. Data Analysis

1. Collect, generate, organize, and display data.
   - Data generated from surveys
   - Unit 6 Assessment
   - "The Search for $1.00 Words"
   - www.mathsolutions.com

2. Read, interpret, select, construct, analyze, generate questions about, and draw inferences from displays of data.
   - Unit 6 Assessment
   - "Food Court" grade 3-5 (6 lessons)
   - Lessons - Illuminations

3. Respond to questions about data and generate their own questions and hypotheses.

### B. Probability

- Unit 6 Assessment
- Lessons - Illuminations
- Everyday Mathematics - Unit 6
1. Determine probabilities of events.

- 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).

- 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.

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

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

Unit 12 Assessment Everyday Mathematics - Unit 12

Authentic performance task "Tiles in a Bag" (version 2) Teaching Children Mathematics

"Spinner Sums" Everyday Mathematics - Units 2 & 12

"Game of Pig" Math by All Means - Probability, Marilyn Burns, 1995

Circulate, complete, and share Discrete Mathematics Workshop, Lisa Ryden, September 2000

"map coloring" About Teaching Mathematics, Marilyn Burns, 2000

"The Handshake Problem"
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
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
Flemington-Raritan School District

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?

<table>
<thead>
<tr>
<th>Knowledge/Skills/Understandings</th>
<th>Assessments</th>
<th>Learning Experiences</th>
<th>Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. Problem Solving</strong></td>
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</tr>
<tr>
<td>1. Learn mathematics through problem solving, inquiry, and discovery.</td>
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<tr>
<td>2. Solve problems that arise in mathematics and in other contexts (cf. workplace readiness standard 8.3).</td>
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<tr>
<td>• problems</td>
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<tr>
<td>3. Select and apply a variety of appropriate problem-solving strategies (e.g., &quot;try a simpler problem&quot; or &quot;make a diagram&quot;) to solve problems.</td>
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<tr>
<td>4. Pose problems of various types and levels of difficulty.</td>
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<tr>
<td>5. Monitor their progress and reflect on the process of their problem solving activity.</td>
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</tr>
</tbody>
</table>

**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.

- Continental Mathematics League: Euclidean
  - Grade 4
  - 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
  - Get It Together, Tim Erickson, 1989
  - Tiguous, Constance Kamii
  - SET - www.setgame.com
  - Frameworks - First 4 Standards - Grades 5-6

**B. Communication**

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

- Reading and writing
- Discussion, listening, and questioning

Grade 4

*Thinker Math* Grades 5-6, 1989

*Problem of the Month, Math Olympiads,*
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
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.
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](http://www.setgame.com)

*Navigation Series*

*Tesselmania*

[mathsolutions.com](http://mathsolutions.com)

*Elementary and Middle School Mathematics*,
John A. Van de Walle
# 5th Grade Gifted and Talented Pacing Guide

<table>
<thead>
<tr>
<th>Unit</th>
<th>Number of Days (approximate)</th>
<th>Unit</th>
<th>Number of Days (approximate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - Data &amp; Landmarks (include histograms)</td>
<td>15</td>
<td>6 - Number Systems &amp; Algebra Concepts</td>
<td>14</td>
</tr>
<tr>
<td>2 - Operations with Whole Numbers &amp; Decimals (division included)</td>
<td>20</td>
<td>5 - Geometry</td>
<td>15</td>
</tr>
<tr>
<td>Metric/Customary Measurement</td>
<td>8</td>
<td>3-D Geometry</td>
<td>7</td>
</tr>
<tr>
<td>3 - Variables, Formulas, &amp; Graphs (Algebra, Number Properties, Order of Operations, adding integers)</td>
<td>20</td>
<td>8 - Rates &amp; Ratios</td>
<td>13</td>
</tr>
<tr>
<td>4 - Rational Number Uses &amp; Operations (Fractions)</td>
<td>20</td>
<td>7 - Probability</td>
<td>5</td>
</tr>
<tr>
<td>Mid-Term</td>
<td>1</td>
<td>9 - Variables, Formulas, &amp; Graphs (more)</td>
<td>10</td>
</tr>
<tr>
<td>Hands on Equations</td>
<td>15</td>
<td>Final</td>
<td>1</td>
</tr>
</tbody>
</table>
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

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).

Everyday Mathematics
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

A Collection of Math Lessons,
Marilyn Burns
Problem Parade
Doug Monteath & Don Volle
Continental Math League
monthly problems
Mathematics Teaching in Middle School
Middle School with Pizzazz;
"Mathematics Teaching in Middle School" (May 1997)

Van de Walle books
Everyday Math Books 1 and 2
Hand on Equations
About Teaching Mathematics, Marilyn Burns
Developing Number Sense Series,

● 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
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.
Flemington-Raritan School District
Mathematics Curriculum

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

- Everyday Mathematics Book 6, Unit 5 & 10
- Navigation through Geometry
- Van de Walle, pages 345-385;
- illuminations
- NCTM Addendum Grades 5-8
- Geometry;
- Geometer’s Sketchpad,
- Seeing Solids and Silhouettes, Terc
- pages 83-95

- Pi Day
- Land Fractions
- Pi Packet
- Slides, Flips & Turns
- Isometry Transformations
- Pattern Blocks
- Journaling

- Principles and Standards for School Mathematics pgs. 240-247
- Van De Walle pgs. 331-336;
- Adapted from About Teaching Mathematics, Marilyn Burns

- 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 \(180^\circ\)
Flemington-Raritan School District
Mathematics Curriculum

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.

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.
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.
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).
## 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

<table>
<thead>
<tr>
<th>Knowledge/Skills/Understandings</th>
<th>Assessments</th>
<th>Learning Experiences</th>
<th>Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. Patterns</strong></td>
<td></td>
<td></td>
<td>Everyday Mathematics unit 3, 6, 8, 9; NCTM Addendum Grades 5-8, Patterns &amp; Functions</td>
</tr>
<tr>
<td>1. Recognize, describe, extend, and create patterns involving whole numbers, and rational numbers and integers</td>
<td>Everyday Mathematics Assessments 4, 6, 8 &amp; 9 Teacher made tests/quizzes White Boards Student sharing Exit Slips Mental Math</td>
<td>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</td>
<td>In the Balance, Creative Publications (Grades 4-6) Problem Parade About Teaching Mathematics, M. Burns, pages 112-124; Hands On Algebra Book III</td>
</tr>
<tr>
<td>● Descriptions using tables, verbal and symbolic rules, expressions, simple equations or graphs.</td>
<td></td>
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</tr>
<tr>
<td>● Finite and infinite sequences ● Formal iterative formulas</td>
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<tr>
<td>● Recursive patterns, including Pascal's Triangle and the Fibonacci Sequence: 1, 1, 2, 3, 5, 8</td>
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<tr>
<td>● Generating sequences by using calculators to repeatedly apply a formula</td>
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</tbody>
</table>

### B. Functions and Relationships
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
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 (>, <, £)

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
### Grade: 5th Gifted and Talented  
### Topic 4.4 Data Analysis, Probability, and Discrete Mathematics

**Essential Questions:**
1. How can classifying help me in organizing data to solve problems?
2. How can statistics help us to understand real world situations?
3. How can the study of real world data help us understand and make accurate predictions?

<table>
<thead>
<tr>
<th>Knowledge/Skills/Understandings</th>
<th>Assessments</th>
<th>Learning Experiences</th>
<th>Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. Data Analysis</strong></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
| 1. Collect, generate, organize, and display data. | 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 | Everyday Mathematics units 1 & 7  
Van de Walle  
Used Numbers, Dale Seymour Publications (1992); Navigations through Probability  
Math by All Means, Marilyn Burns  
NCTM Illuminations; Problem Parade |
| 2. Read, interpret, select, construct, analyze, generate questions about, and draw inferences from displays of data. | | | |
| | | Journaling  
Groundworks  
Partner work/ Disease Z  
Do Now  
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 | | | |
• 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.
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 3x4 = 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
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.
Flemington-Raritan School District
Mathematics Curriculum

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?

<table>
<thead>
<tr>
<th>Knowledge/Skills/Understandings</th>
<th>Assessments</th>
<th>Learning Experiences</th>
<th>Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Problem Solving</td>
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<td>1. Learn mathematics through problem solving</td>
<td>Exit slips</td>
<td>Various open-ended i questions</td>
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<td>Teacher observation with feedback</td>
<td>Monthly CM L's</td>
<td>q</td>
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<td>Mental Math Reflexes</td>
<td>Monthly menu problems</td>
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<td>Estimation</td>
<td>Portfolio evaluation</td>
<td>i</td>
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<td></td>
<td>Making Conjectures</td>
<td>Various activities</td>
<td>r</td>
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<td>Showing use of efficient math strategies</td>
<td>Sharing problem-solving strategies</td>
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<td>Effective use of technology</td>
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<tr>
<td>2. Solve problems that arise in mathematics and in other contexts</td>
<td>Journaling; reflexive writing; class discussions</td>
<td>Division with Fractions attachment #18</td>
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<td>&quot;Fat Content in Foods&quot;</td>
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<td>Teaching Children Mathematics, NCTM</td>
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<td>-Menu of Problems</td>
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<td>KSK attachments # 17a &amp; 17b</td>
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Flemington-Raritan School District

Math Curse
Sir Circumference

Everyday Mathematics, Unit 8 Lesson 5
Everyday Mathematics, Unit 8 Lesson 12
Everyday Mathematics, embedded throughout
Hands-On Algebra, Book III
Everyday Mathematics, Unit 4 Lesson 10

About Teaching Mathematics,
M. Burns, pages 102 and 105
Flemington-Raritan School District
Mathematics Curriculum

- Open ended problems
  - Group discussion;
  - Examining & use student Reference Book Strategy
  - Share
  - Student Discourse

- Non-routine problems
  - Partner work;
  - Journal pages;
  - "Graphing Garbage"
  - King Arthur Problem;
  - Prison Problem

- 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.

NCTM illuminations grades 6-8
NCTM illuminations;
Navigations through Geometry
Geometer's Sketch Pad
Tinkerplots
Game of Set

Get-it-Together
Family Math Book
Kagan Cooperative Learning Activities
Super Source
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.
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, the 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)
● 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).
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
  - Unfix 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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<td><em>Teaching Student Centered Math Grades 5-8, Vol 3</em></td>
<td>John Van DeWalle, LoAnn Lovin</td>
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United We Solve - Math Problems for Groups Grades 5-10

Tim Erickson

Eeps

1996

Brain Pop Subscription

[Link](www.brainpop.com)
<table>
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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:
   o 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.
   o 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.
   o 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.
   o 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 = − 3, 6 + 6 =

C. Extend the counting sequence.
   o 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.
   o 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.
   o 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.
   o 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.
   o 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.
   o 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.
   o 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.
   o 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)]
   o 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.
   o 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
   o 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.
   o 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; i.e. The number of rows and columns (area), and fraction of whole.