Mathematics Curriculum
Grades K-6

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

**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>
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</tbody>
</table>
| 1. Use real life experiences, physical materials, and technology to construct meaning for numbers. | Observation of students exploration with manipulatives  
Oral assessment  
Mid Year/End of Year Assessments | "Look and Find" (Numbers 1-10)  
Egg-Carton Mathematics | *Everyday Math: Teacher's Guide*

- *Demonstrates understanding of one-one correspondence. (e.g., places one placement at each place, gives each child one cookie, places one animal in each trunk, hands out manipulatives to be shared with a friend saying "One for you, one for me.") (Preschool)*
  - *Verbally counts 20 or more objects in a random arrangement.*  
  - *Identifies small numbers without counting.*

- Mid-Year and Final: One-to-One Correspondence to 20  
  - Teacher number cards  
  - Act. Making Towers  
  - Grow and Shrink  
  - Creations  
  - Unifix Cubes  
  - Digi-Blocks  

- Final: Subitizing with Finger Patterns  
  - Finger Counting  
  - Say-It Fast Cards  
  - High Roller game  

*Everyday Math: Teacher’s Guide  
Developing Number Concepts: Counting, Comparing, and Pattern, Kathy Richardson
### Flemington-Raritan School District
Mathematics Curriculum

**Performs verbal counting to 100.**
- Mid-Year and Final: Forward counting 1...to 100
- Interrupted skip counts
- Listen and Do
- Number line
- Interrupted Counts (0-50)
- Number Hunt and 100 chart
- Games on 100 Chart

**Count with calculator using the repeat key.**
- Monitor correct use of calculator
- Counting and Calculators
- Calculator Displays
- Counting Shortcut

**Expose to ordinal numbers and terminology**
- Ordinal Numbers: Standing in Line

**(Preschool)**
- *Reads any number, 30 or less.*
  - Teacher Observation
  - Mid-Year and Final: Numeral Identification to 30

**Learn to say counting numbers.**
  - *Listen to **EM Activity:**
    - Monthly Calendar
    - Number Board
    - Teen Partner Game
    - Monster Squeeze Game
    - EM Game: Top It
    - Teen Number Spin

2. Demonstrate an understanding of place value concepts.

**Recognizes and names some written numerals.**
- Oral assessment

**(Preschool)**
- *Understands teen numbers in terms of 10’s and 1’s.*
  - Student participation in whole class discussion
  - Teen Partner Game
  - Listen and Do (10-20) Digit Game
  - Double Digit Dice Game
| Flemington-Raritan School District  
<table>
<thead>
<tr>
<th>Mathematics Curriculum</th>
</tr>
</thead>
</table>
| **Writes numerals 0 - 10.**  
| **Reads and writes numbers, 100 or less.**  |
| Final: Writes numerals 0 - 10, randomly.  
| Oral / Slate Assessments  |
| Slate writing activities  
| Number Books: Writing 0 - 10  
| Number Hunt and 100 Chart  
| Preparation for 100 Day  
| 100 Number Grids  
| Double Digit Dice Game  
| Class Collection Project (100 poster)  
| Writing on Backs  
| Spin a number (1 - 10)  
| Interrupted Skip Counts (0 - 50)  
| Number Grid  
| Say the Next Number by 1 0s  
| Countdown  
| Counting Backwards with / without calculators  
| Say the Next Number  |
| **Counts backwards from 10.**  
| **Counts backwards from 22.**  |
| Mid-Year and Final:  
| Counting Backwards 10 - 0  |
| Everyday Math: Teacher's Guide  
| Developing Number Concepts: Counting, Comparing and Pattern, Kathy Richardson  
| Teacher Number Cards Activities  |
| **Counts by 10's to 100.**  
| **Counts by 5's.**  
| **Counts by 2's.**  |
| Final: Skip Counts by 10's  
| Skip count by 10's  
| Counting on calculators  
| Say the Next Number by 10s  
| Introduction to Skip Counting by 2's  
| Count Fingers by 5's  
| Count using tally marks  
| Count to 70 by 10s  |
| **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)*

<table>
<thead>
<tr>
<th>Activity</th>
<th>Method</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher observation</td>
<td></td>
<td><a href="#">Everyday Math: Teacher’s Guide</a></td>
</tr>
<tr>
<td>Teacher observation</td>
<td></td>
<td><a href="#">Everyday Math: Teacher’s Guide</a></td>
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<tr>
<td>Attendance Routine</td>
<td></td>
<td><a href="#">Everyday Math: Teacher’s Guide</a></td>
</tr>
<tr>
<td>Recording daily temperature Weather Chart</td>
<td></td>
<td><a href="#">Everyday Math: Teacher’s Guide</a></td>
</tr>
<tr>
<td>Divide Groups into Half Groups</td>
<td></td>
<td><a href="#">Everyday Math: Teacher’s Guide</a></td>
</tr>
</tbody>
</table>

### 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.**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Method</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher Observation</td>
<td></td>
<td><a href="#">Everyday Math: Teacher’s Guide</a></td>
</tr>
<tr>
<td>Counters, &quot;real&quot; objects</td>
<td></td>
<td><a href="#">Everyday Math: Teacher’s Guide</a></td>
</tr>
<tr>
<td>Ongoing informal Teacher assessment</td>
<td></td>
<td><a href="#">Everyday Math: Teacher’s Guide</a></td>
</tr>
<tr>
<td>Observation of student while interacting with coins during play</td>
<td></td>
<td><a href="#">Everyday Math: Teacher’s Guide</a></td>
</tr>
<tr>
<td>Coins in the Classroom</td>
<td></td>
<td><a href="#">Everyday Math: Teacher’s Guide</a></td>
</tr>
<tr>
<td>Matching Coin Game</td>
<td></td>
<td><a href="#">Everyday Math: Teacher’s Guide</a></td>
</tr>
<tr>
<td>Exploring the Penny</td>
<td></td>
<td><a href="#">Everyday Math: Teacher’s Guide</a></td>
</tr>
<tr>
<td>Using the cent sign</td>
<td></td>
<td><a href="#">Everyday Math: Teacher’s Guide</a></td>
</tr>
<tr>
<td>Introduction of nickel and dime</td>
<td></td>
<td><a href="#">Everyday Math: Teacher’s Guide</a></td>
</tr>
<tr>
<td>Coin Sorting</td>
<td></td>
<td><a href="#">Everyday Math: Teacher’s Guide</a></td>
</tr>
<tr>
<td>Coin Dice</td>
<td></td>
<td><a href="#">Everyday Math: Teacher’s Guide</a></td>
</tr>
<tr>
<td>Comparing Coins by Feel</td>
<td></td>
<td><a href="#">Everyday Math: Teacher’s Guide</a></td>
</tr>
<tr>
<td>Informally introduce the cents symbol as a label</td>
<td></td>
<td><a href="#">Everyday Math: Teacher’s Guide</a></td>
</tr>
<tr>
<td>Play Store</td>
<td></td>
<td><a href="#">Everyday Math: Teacher’s Guide</a></td>
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</tbody>
</table>
**Flemington-Raritan School District**  
**Mathematics Curriculum**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Observation of students</th>
<th>Use play money</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Introduce the one-dollar bill</em></td>
<td>Observation of students</td>
<td>Use play money</td>
<td><em>Everyday Math: Teacher's Guide</em></td>
</tr>
<tr>
<td><em>Introduce the ten dollar bill</em></td>
<td>Observation of students</td>
<td>Use play money</td>
<td><em>Everyday Math: Teacher's Guide</em></td>
</tr>
</tbody>
</table>

5. **Compare and order whole numbers.**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Observation of student</th>
<th>Playing cards</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<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>Playing cards (EM)</td>
<td><em>Everyday Math: Teacher's Guide</em></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Activity</th>
<th>Counters, Number line</th>
<th><em>Everyday Math: Teacher's Guide</em></th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Sequence low to high.</em></td>
<td>EM Game: Monster Squeeze</td>
<td></td>
</tr>
<tr>
<td><em>Sequence low to high.</em></td>
<td>Give the Next Number</td>
<td></td>
</tr>
<tr>
<td><em>Sequence low to high.</em></td>
<td>Children's Number Cards</td>
<td></td>
</tr>
<tr>
<td><em>Sequence low to high.</em></td>
<td>Partner Match</td>
<td></td>
</tr>
<tr>
<td><em>Sequence low to high.</em></td>
<td>Ordinal Numbers: Standing in Line</td>
<td></td>
</tr>
<tr>
<td><em>Sequence low to high.</em></td>
<td>Reading and Comparing Numbers</td>
<td></td>
</tr>
</tbody>
</table>
### B. Numerical Operations

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

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

   - **Everyday Math: Teacher's Guide**

*Joining, separating and comparing.*

- **Oral / Slate assessment**  
- **Draw pictures, use models, manipulatives, counting objects**

- **Everyday Math: Teacher's Guide**

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

- **Teacher Observation**  
- **Number line Mathematics Change to More number stories**

- **Everyday Math: Teacher's Guide**

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

- **Oral communication with teacher**  
- **Change to Less number stories**

- **Everyday Math: Teacher's Guide**

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

- **Teacher Observation**  
- **Dominoes Name Collections**
- **Bead String Name Collection**
- **Craft Stick Name Collection**

- **Everyday Math: Teacher's Guide**

*Developing Number Concepts: Counting, Comparing and Pattern, Kathy Richardson*
Flemington-Raritan School District  
Mathematics Curriculum

<table>
<thead>
<tr>
<th>Mathematics Activity</th>
<th>Assessment Method</th>
<th>Related Resource</th>
</tr>
</thead>
<tbody>
<tr>
<td>Developing the basic meaning of addition and subtraction in real situations, in children’s own number stories, oral problems, concrete objects and number lines.</td>
<td>Teacher Observation</td>
<td>Joining Objects</td>
</tr>
<tr>
<td></td>
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<td>Change to Less</td>
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<tr>
<td></td>
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<td>Pocket Game</td>
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<td>Disappearing Train</td>
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<td>High Roller</td>
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<td></td>
<td></td>
<td>What Number Am I</td>
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<td></td>
<td>Thinking of?</td>
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<td>Every Day Math: Teacher’s Guide</td>
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<td></td>
<td>Developing Number Concepts: Counting, Comparing and Pattern, Kathy Richardson</td>
</tr>
<tr>
<td>Participates in solving oral number stories.</td>
<td>Oral assessment</td>
<td>Number Stories throughout the Year</td>
</tr>
<tr>
<td></td>
<td>Student sharing of own stories and solutions</td>
<td>envelopes, number cards, and other manipulatives.</td>
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<td></td>
<td>Divide Groups into Half</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Groups use manipulatives</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Every Day Math: Teacher’s Guide</td>
</tr>
<tr>
<td>Divide even groups into half. Observation of student while exploring task with manipulatives</td>
<td>High Roller</td>
<td>Every Day Math: Teacher’s Guide</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Mathematics Activity</th>
<th>Assessment Method</th>
<th>Related Resource</th>
</tr>
</thead>
<tbody>
<tr>
<td>Develop proficiency with basic addition using the strategy of counting on.</td>
<td>Oral / Slate Assessment</td>
<td>One More or One less</td>
</tr>
<tr>
<td>Explore counting one more or one less)</td>
<td></td>
<td>Developing Number Concepts: Counting, Comparing, and Pattern, Kathy Richardson</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Mathematics Activity</th>
<th>Assessment Method</th>
<th>Related Resource</th>
</tr>
</thead>
<tbody>
<tr>
<td>Determines which of two groups is more and which is less.</td>
<td>Final: Weather Graph</td>
<td>More or Less Activities</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(DNC) Stack, Tell, Spin and Win</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Developing Number Concepts: Counting, Comparing, and Pattern, Kathy Richardson</td>
</tr>
</tbody>
</table>
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.
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>A. Geometric Properties</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Identify and describe spatial relationships among objects in space and their relative shapes and sizes.</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. (ex. Put the red block on top of the cabinet.)</em> (list words) (Preschool)</td>
<td>Teacher Observation</td>
<td>Classroom activities</td>
<td><em>&quot;Do the Hokey Pokey&quot;</em></td>
</tr>
</tbody>
</table>
| 2. Use concrete objects and drawings to identify, classify and describe standard three-dimensional and two-dimensional shapes. *vertex, edge, face, side*  
*3-D figures - cube, rectangular prism, sphere, cone cylinder, and pyramid*  
*2-D figures - square, rectangle, circle, triangle*  
*Relationships between three- and two-dimensional shapes (e.g., the face of a 3D shape is a 2D shape).* | Observation of student while interacting with manipulatives | Using A Pattern Block Template  
Shapes By Feel  
Compare shapes  
"I Spy"  
Comparing four-sided polygon | *Everyday Math: Teacher's Guide* |

*Identifies basic shapes in the environment (e.g., circle, square, triangle, cube, sphere). (Preschool)*  
*Makes three-dimensional constructions and models (e.g., sculptures that have height, depth, and width). (Preschool)*  
*Makes connections between two-dimensional and three-dimensional forms (circle-sphere, square-cube, triangle-pyramid). (Preschool)*

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

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

Mid-Year and Final: Names shapes

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

Everyday Math: Teacher’s Guide

3. Describe and identify and create instances of symmetry.

Observation of student exploration while interacting with manipulatives

Symmetry with Paints

Everyday Math: Teacher’s Guide

*Has experiences with basic geometry shapes and symmetry concepts

Whole class discussion

Symmetry in Nature
Symmetry Fold and Cut Projects

Everyday Math: Teacher’s Guide

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

*Identifies, describes and uses pattern blocks.

Teacher Observation

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

Everyday Math: Teacher’s Guide

B. Transforming Shapes

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

Observation of student creations

Shape Designs
Pattern Blocks

Everyday Math: Teacher’s Guide
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)

Teacher observation

Counting Walks

Everyday Math: Teacher's Guide

*Follows a simple map.

Teacher observation

Following a Simple Map

Everyday Math: Teacher's Guide

D. Units of Measurement

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

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. | Whole Class discussion | Comparing Length: use parts of body as measures | *Everyday Math: Teacher’s Guide*
| Teacher observation | Marking off Lengths | |
| *Estimates and compares length using non-standard and standard units.* | Partner Match | |
| Building and Measuring in the Block Corner | EveryDay Math: Teacher’s Guide | |
| 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 | *Everyday Math: Teacher’s Guide*
| | Rocker Balance | Make science connections |
| | Things that Float or Sink | |

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

| *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)* | Whole class discussion | Door Clock | *Everyday Math: Teacher’s Guide*
| Oral assessment | Hour clock | |
| | Explore duration of an hour | Hour Hand, Minute Hand Story | |
| | Match Game: Analog and Digital Clock (o’clock) | |

| *Become familiar with the clock face | *Estimates and compares length using non-standard and standard units.* | *Everyday Math: Teacher’s Guide*
| *Explore shapes using constant perimeter | *Read hourly clock times | *How Big is a Foot?, Rolf Myller*
<p>| | | <em>Inch by Inch, Leo Leonni</em> |</p>
<table>
<thead>
<tr>
<th>Activity</th>
<th>Resource</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimate measures.</td>
<td></td>
</tr>
<tr>
<td>*Uses vocabulary to describe distances (e.g., short, long) (Preschool)</td>
<td>Everyday Math: Teacher's Guide</td>
</tr>
<tr>
<td>*Estimates times on an analog clock using only the hour hand.</td>
<td>Everyday Math: Teacher's Guide</td>
</tr>
<tr>
<td>*Explore timed activities</td>
<td>Everyday Math: Teacher's Guide</td>
</tr>
</tbody>
</table>

**Teacher Observation**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Resource</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comparing Body Heights to Objects</td>
<td>Everyday Math: Teacher's Guide</td>
</tr>
</tbody>
</table>

**Oral assessment**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Resource</th>
</tr>
</thead>
<tbody>
<tr>
<td>Make an Hour Hand Clock</td>
<td>Everyday Math: Teacher's Guide</td>
</tr>
</tbody>
</table>

**Observation of student participation in activity**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Resource</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beating out Time</td>
<td>Everyday Math: Teacher's Guide</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Activity</th>
<th>Resource</th>
</tr>
</thead>
<tbody>
<tr>
<td>How Long is a Minute?</td>
<td>Everyday Math: Teacher's Guide</td>
</tr>
</tbody>
</table>
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>
<td></td>
<td></td>
</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</td>
<td><em>Everyday Math: Teacher's Guide</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Patterns with Colors Stand, Squat or Kneel Pattern</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Macaroni Necklaces BINGO Sing a pattern song</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Three Object Pattern ABC or other</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mid-Year: Identify a pattern.</td>
<td>Give the Next Number Counting Patterns</td>
<td><em>Everyday Math: Teacher's Guide</em></td>
</tr>
<tr>
<td></td>
<td>Final: Create and extend a pattern.</td>
<td>Class Patterning Follow My Pattern</td>
<td><em>Developing Number Concepts: Counting, Comparing and Patterns, Kathy Richardson</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td>B-I-N-G-O</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>What's My Rule?.......Fishing Patterning Activities (DNC)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Shoe Pattern</td>
<td></td>
</tr>
</tbody>
</table>

*Matches, copies and extends simple patterns.*

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

*Identify a function rule.*

<table>
<thead>
<tr>
<th></th>
<th>Learning Experiences</th>
<th>Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observation of student while exploring mathematical idea Oral assessment</td>
<td>What's My Rule?... Pairs of Numbers, Numbers in Sequence, Numbers out of Sequence, Large Numbers</td>
<td><em>Everyday Math: Teacher's Guide</em></td>
</tr>
</tbody>
</table>
C. Modeling

1. Recognize and describe changes over time (e.g., temperature, height).
   * Describe the sequence of the daily routine and demonstrates understanding of basic temporal relations. (e.g., We will go outside after snack time.) (Preschool)

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

   Teacher supplement

D. Procedures

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

   Student-teacher interview
   Calendar activities, counters and other manipulatives

   Teacher supplement

   Everyday Math: Teacher's Guide
# Flemington-Raritan School District
## Mathematics Curriculum

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

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

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

* Everyday Math: Teacher's Guide

Teacher Observation

Graphing Sums of Dice Throws

C. Discrete Mathematics - Systematic Listing and Counting

1. Sort and classify objects according to attributes.

* Venn diagrams

Teacher Observation

Counters, "real" counting items

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

Teacher Observation

Counters, "real" counting items

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

Teacher Observation

Counters, "real" counting items

* Sorts objects using varying attributes; shares strategies.

Final: Attribute Block

Sorting

Read My Mind

Everyday Math: Teacher's Guide

Sorting Boxes

Attribute Block guide

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

Teacher observation, Student discussion

Counters, "real" counting items

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

Teacher observation, Student discussion

Counters, "real" counting items

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

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

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

Teacher observation

Rug and classroom group activities

Classroom chime
Flemington-Raritan School District

Grade: Kindergarten  Standard 4.5 Mathematical Processes
Big Idea: Mathematical understandings are an essential part of our lives in and out of school and as such all children need to have an instinctive sense of mathematical resources that they can rely on to help them progress through life.

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

<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. Problem Solving</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>“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)</td>
<td>Teacher observation</td>
<td>Meet the Calculator</td>
<td>Teacher supplement Everyday Math: Teacher's Guide</td>
</tr>
<tr>
<td>3. Select and apply a variety of appropriate problem solving strategies. “Describe how he/she solved mathematical problems in his/her own way. (Preschool)</td>
<td>Teacher observation</td>
<td>Student Discussion</td>
<td>Teacher supplement</td>
</tr>
<tr>
<td>B. Communication</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Use the language of mathematics to express mathematical ideas precisely.</td>
<td>Teacher observation</td>
<td>Birthday Graph</td>
<td>Everyday Math: Teacher's Guide</td>
</tr>
</tbody>
</table>

Teacher observation Classroom Playing Cards Teacher supplement Everyday Math: Teacher's Guide
### Flemington-Raritan School District

<table>
<thead>
<tr>
<th>C. Connections</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2. Use connections among mathematical ideas to explain concepts.</strong></td>
</tr>
<tr>
<td>Teacher observation</td>
</tr>
<tr>
<td>Teacher supplement with questions</td>
</tr>
</tbody>
</table>

| **3. Recognize that mathematics is used in a variety of contexts outside of mathematics.** |
| Teacher observation | 2-D and 3-D Objects |
| Teacher supplement with questions | Teacher observation Engage student in play that facilitates simple problem solving |

<table>
<thead>
<tr>
<th>D. Reasoning</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2. Use reasoning to support their mathematical conclusions and problem solutions.</strong></td>
</tr>
<tr>
<td>Observation of partner play</td>
</tr>
</tbody>
</table>

| **Use emergent mathematical knowledge as a problem-solving tool. (Preschool)** |
| Teacher observation | Teacher supplement |
| Teacher supplement Use literature books | Teacher observation Everyday Math: Teacher's Guide |

| **6. Evaluate examples of mathematical reasoning and determine whether they are valid.** |
| Teacher observation | Everyday Math: Teacher's Guide |

---

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

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

   **Observation of student while interacting with manipulatives as they explore math ideas**
   **Provide opportunities for students to model mathematical ideas using manipulatives and other models**

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

   **Teacher observation / Student responses**
   **Classroom symbols, school symbols, bathroom symbols, street light**

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

   **Teacher observation Classroom Playing Cards**

   **Everyday Math: Teacher's Guide**

### F. Technology

4. Use calculators as problem-solving tools.

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

   **Everyday Math: Teacher's Guide**
# 1st Grade Math Pacing Guide

<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>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>
**Flemington-Raritan School District**  
**Mathematics Curriculum**

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

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

*Count by 2's to 100; Count by 5's to 100*  
Choral skip counting.  
Stop and start counting  
Tallies & Nickels & Pennies  
*Everyday Mathematics* Lesson 1.2, 1.12, 1.13, 2.7, 2.9, 2.10, 3.2, 3.3  
ongoing throughout the year
<table>
<thead>
<tr>
<th>Task</th>
<th>Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>*Count up and back by 1’s on the number grid to 100</td>
<td>*Everyday Mathematics, Lesson 1.5, 1.7, 2.1, 9.1</td>
</tr>
<tr>
<td>*Writes any number 100 or less</td>
<td>*EM Skills Link</td>
</tr>
<tr>
<td>*Count up and back by 10’s starting with any given number up to and including 100</td>
<td>*Everyday Mathematics, Lesson 6.6, 9.2</td>
</tr>
<tr>
<td>*Practice counting on a number line</td>
<td>*Everyday Mathematics, Lesson 3.2, 3.5, 3.6, 3.9, 5.4</td>
</tr>
<tr>
<td>*Write and count tallies</td>
<td>*Everyday Mathematics, Lesson 1.7, 2.9</td>
</tr>
<tr>
<td>*Find equivalent names for a number</td>
<td>*Everyday Mathematics, Lesson 6.2</td>
</tr>
<tr>
<td>*Explore parts and total relationships</td>
<td>*Everyday Mathematics, Lesson 3.14, 4.6, 5.8, 9.4</td>
</tr>
<tr>
<td></td>
<td>*Fraction Action, Loreen Leedy</td>
</tr>
</tbody>
</table>
*Identify fractional parts of regions and sets with a focus on unit fractions

*Find equivalent fractions

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

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

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

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

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

3. Identify whether a number is even or odd.
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

Everyday Mathematics, Lesson 2.8-2.11, 3.11, 3.12, 8.1
Teacher supplement

Elementary School Mathematics with Pizzazz, Creative Publications

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

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

* Exchange pennies for nickels

Everyday Mathematics, Lesson 2.9, 2.10, 3.11, 3.12

Everyday Mathematics, Lesson 2.9, 2.10, 3.11, 3.12

* 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
*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
B. Numerical Operations

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

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

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

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

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
*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.

2. 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>
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<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>A. Geometric Properties</td>
<td>Oral / Slate Assessment</td>
<td>Pattern Blocks</td>
<td>Make appropriate connections to Science Curriculum</td>
</tr>
<tr>
<td>1. Identify and describe spatial relationships among objects in space and their relative shapes and sizes.</td>
<td>Unit Assessments</td>
<td>3D shapes</td>
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<tr>
<td></td>
<td>Do Now</td>
<td>Geometric template</td>
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<td>Teacher Observation</td>
<td>Geoboards</td>
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<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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<tr>
<td></td>
<td>Recognizing Student Achievement sections in Everyday Math 3</td>
<td>Attribute blocks</td>
<td></td>
</tr>
</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.

---

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

* 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

* Everyday Mathematics, Lesson 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.  
   * Use standard units for measuring length (centimeters/inches)  
   * Centimeter measures (Grade 2 secure)

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

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, Arctic 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, K-3, Lovin and Van de Walle

E. Measuring Geometric Objects

Teacher supplement

*Measuring and drawing line segments

Everyday Mathematics, Lesson 4.2 - 4.5, 6.6,
Flemington-Raritan School District
Mathematics Curriculum

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

<table>
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<th>Knowledge/Skills/Understandings</th>
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<th>Learning Experiences</th>
<th>Resources</th>
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</thead>
<tbody>
<tr>
<td>A. Patterns</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Recognize, describe, extend, and create patterns.</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>Pattern Blocks Attribute blocks Craft sticks Dominoes EDM Activities EDM Games Number grids Frames and Arrows</td>
<td>NJ Mathematics Curriculum Framework, selected activates for grades K-2 Everyday Mathematics, Lesson 3.1, 3.4, 3.5, 7.3 Website resources</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

   Teacher supplement

   * Everyday Mathematics, Lesson 5.10

   Activities, ongoing throughout the year

   Teacher supplement

   * Everyday Mathematics, Activities, ongoing throughout the year

   Teacher supplement

   * Everyday Mathematics, Lesson 5.3, 5.6

   Teacher supplement

   * Everyday Mathematics, Lesson 5.6
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>
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<th>Learning Experiences</th>
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</thead>
<tbody>
<tr>
<td><strong>A. Data Analysis</strong></td>
<td></td>
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<td></td>
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</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* |

*Introduce line plots*
Flemington-Raritan School District
Mathematics Curriculum

*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.  
Teacher supplement

2. Color simple maps with a small number of colors.  
See map skills Social Studies Curriculum  
Website resources

3. Play simple two-person games and informally explore the idea of what the outcome should be.  
Teacher supplement
Flemington-Raritan School District
Mathematics Curriculum

Grade: 1  Standard 4.5 Mathematical Processes

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

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

<table>
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</thead>
<tbody>
<tr>
<td>A. Problem Solving</td>
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<tr>
<td>1. Learn mathematics through problem solving, inquiry, and discovery.</td>
<td>Oral / Slate Assessment</td>
<td>EDM games</td>
<td>Everyday Mathematics, Activities throughout the year</td>
</tr>
<tr>
<td></td>
<td>Unit Assessments</td>
<td>EDM Activities</td>
<td>Groundworks Series, selected problems</td>
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<tr>
<td></td>
<td>Do Now</td>
<td>Explore ways to solve problems using manipulatives, models, drawing a picture, acting it out, working backwards, guessing and checking</td>
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<td></td>
<td>Teacher Observation</td>
<td>Best of Math I and II, Exemplars CD</td>
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<tr>
<td></td>
<td>Discussion</td>
<td>Website resources for appropriate leveled problems</td>
<td></td>
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<tr>
<td></td>
<td>Open Ended Writing</td>
<td>Read It, Draw It, Solve It - Dale Seymour Publications</td>
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<td>Tasks</td>
<td>8-Step Model Drawing Crystal Springs Books</td>
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<td>Recognizing Student Achievement sections in Everyday Math 3</td>
<td>The Problem-Solver Creative Publications</td>
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<td></td>
<td>Everyday Math 3</td>
<td>Roads To Reasoning Creative Publications</td>
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</tbody>
</table>

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

Teacher supplement Sample open-ended problems, various resources Everyday Mathematics, Unit Assessment Open Response NJ Mathematics Curriculum Frameworks, selected activities

Website resources

Best of Math I and II, Exemplars CD
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.
C. Connections
1. Recognize recurring themes across mathematical domains.
   Everyday Mathematics, Lesson 1.2, 1.9
   Teacher supplement

2. Use connections among mathematical ideas to explain concepts.
   Project: 5 Apple Math
   Project 2 Amaryllis Plant

3. Recognize that mathematics is used in a variety of contexts outside of mathematics.
   Project 1 Geometric Gift
   Wrap and Greeting Cards
   Everyday Mathematics, Lesson 1.9, 2.2
   Link to Social Studies: discuss museum, community helpers

4. Apply mathematics in practical situations in other disciplines.
   Seed Unit, Climate Zones
   Science Curriculum, Social Studies Curriculum
   Everyday Mathematics, Lesson 4.9
   See Science, Social Studies curriculum for resources and connections

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.
   Everyday Mathematics, Lesson 7.4

2. Use reasoning to support their mathematical conclusions and problem solutions.
   Everyday Mathematics, Lesson 1.10, 7.4

4. Rely on reasoning, rather than answer keys, teachers, or peers, to check the correctness of their problem solutions.
   Teacher supplement
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.
## Second Grade Math Pacing Guide

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<tr>
<th>Unit</th>
<th>Number of Days (Approximate)</th>
<th>Unit</th>
<th>Number of Days (Approximate)</th>
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<tbody>
<tr>
<td>1 - Number and Routines</td>
<td>14</td>
<td>7 - Patterns and Rules</td>
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<tr>
<td>2 - Addition &amp; Subtraction</td>
<td>18</td>
<td>8 - Fractions</td>
<td>12</td>
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<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>
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<tr>
<td>5 - 3-D and 2-D Shapes</td>
<td>13</td>
<td>11 - Whole-Number Operations Revisited</td>
<td>14</td>
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<tr>
<td>6 - Whole Number Operations &amp; Number Stories</td>
<td>15</td>
<td>12 - Year-End Review &amp; Extensions</td>
<td>10</td>
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<tr>
<td>Mid-Year Benchmark Assessment</td>
<td>1</td>
<td>End-of-the-Year Benchmark Assessment</td>
<td>1</td>
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</table>
Flemington-Raritan School District
Mathematics Curriculum

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

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<tbody>
<tr>
<td><strong>A. Number Sense</strong></td>
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</tbody>
</table>
| 1. Use real-life experiences, physical materials, and technology to construct meanings for numbers (unless otherwise noted, all indicators for grade 2 pertain to these sets of numbers as well) | Unit Assessments  
Do Now  
Teacher Observation  
Discussion  
Open Ended Writing Tasks  
Recognizing Student Achievement sections in Everyday Math 3 | Direct Instruction  
Collaborative and Cooperative Learning  
Open Ended Writing Tasks  
EM Games  
Digi-blocks  
Base Ten Blocks  
Calendar skills | NJ Mathematics Curriculum Framework grades K-2, selected activities |

* **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**

Everyday Mathematics, Lesson 1.3  
Teacher supplement  
*Everyday Mathematics, Lesson 1.1  
Everyday Mathematics, Lessons Unit 8 & 11  
Teacher supplement  
Website resources  
*Elementary School Mathematics with Pizzazz, Creative Publications  
Everyday Mathematics, Lessons 1.10, 1.11  
Everyday Mathematics, Lessons 1.7, 1.9, 1.11, 1.12
### Mathematics Curriculum

- *Find equivalent names for numbers*  
  - Fact Families
  - Funny Numbers
  - Roman Numerals
  - Ten-Frames

- *Name collection boxes*  
  

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

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

- *Give the fraction name for the shaded part of a region or collection (Denominators 2, 3, 4, 8, 10)*  
  - Auntie Pasta's Fraction Game

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

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**Everyday Mathematics Lessons**

- 1.9 1.13, 2.9,

- Eating Fractions, Bruce McMillian
- Gator Pie, Louise Matthews
- Everyday Mathematics, Lessons 8.1, 8.2
- Teacher Supplement: Teaching Student-Centered Mathematics, K-3, Lovin and Van de Walle

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

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

- Everyday Mathematics, Lessons 8.4, 8.5
- EM resource for fraction circles, Math Masters, page 144
*Recognize equivalent fraction names
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
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.

   * 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.
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

*Solve simple addition number stories.

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

Everyday Mathematics, Lessons 2.7, 4.1, 4.2
Teacher supplement
Website resource
Putting Together & Taking Apart, student sheets 13-16,
Dale Seymour Publications by K. Economopoulos & S.J. Russell

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.

Solve addition and subtraction stories

Close To 20

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

*Model multiplication and division with arrays.

*Construct multiplication/division fact families.

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

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

Everyday Mathematics, Lesson 6.2
NJPASS State rubric

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

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

Everyday Mathematics, Lessons
11.7 - 1.9, 12.4, 12.5

Everyday Mathematics, Lesson 7.1, 11.6

Everyday Mathematics, Lesson 11.7
Flemington-Raritan School District
Mathematics Curriculum

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

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

Everyday Mathematics
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 Folktale, Lily Toy Hong
(+ /- Facts table)
(Domino-Dot Patterns)
(+ (shortcut)
Facts in a Flash
Fast Facts
Website resources
*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
4. Construct, use and explain procedures for performing addition and subtraction calculations with:
  * pencil and paper
  * mental math
  * calculator
    * Add and subtract multiples of 10

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

  * Find missing addends for the next multiple of 10.

5. Use efficient and accurate pencil and paper procedures for computation with whole numbers.
  * Addition of 2-digit numbers
  * Subtraction of 2-digit numbers

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

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

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

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

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

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

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

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

*Make ballpark estimates

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

*Frames and Arrows

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

*What's My Rule? Everyday Mathematics, Lesson 2.11 and ongoing throughout the year
See also Function machines

*Diagramming Number Stories

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

*Understand parts to whole relationships using addition and subtraction.

Everyday Mathematics, Grades K-3, Lovin and Van de Walle
Teacher Supplement

*Develop and find missing addends.
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.
Flemington-Raritan School District
Mathematics Curriculum

Grade: 2 Standard 4.2 Geometry and Measurement
Essential Questions: How can knowledge of geometric properties help in problem solving situations? How can coordinate grid systems help in understanding locations? How does the mathematics of geometry enable us to wonder and understand our natural and physical world?

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

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

* Vertex, edge, face, side

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

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

Everyday Mathematics, Lesson 5.4
Teacher supplement

Everyday Mathematics, Lesson 5.2

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

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
Flemington-Raritan School District
Mathematics Curriculum

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

Everyday Mathematics, Lesson 5.3 & 5.4
Teacher supplement

*Relationships between three-and two dimensional shapes

Groundworks Reasoning with Measurement, Creative Publications

Everyday Mathematics, Lesson 5.6 & 5.7

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

Shapes, Halves, and Symmetry pg. 196 & 197

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

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

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

Everyday Mathematics, Lesson 5.5

B. Transforming Shapes

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

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

2. Combine and subdivide simple shapes to make other shapes

Everyday Mathematics, Lesson 5.1, 5.5, 8.2
Teacher supplement
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

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

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

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

*Introduce the mile and kilometer

Everyday Mathematics, Lesson 9.5

*Weight- pound, gram, kilogram
*ounce

Everyday Mathematics, Lesson 2.8, 7.5, 9.9

*Capacity- pint, quart, liter

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

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

Everyday Mathematics, Lesson 1.3, 5.1, 12.1 – 12.3

*Tell time to five minute intervals

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

Everyday Mathematics Lesson 3.3, 3.4, 5.1, 12.2
Website resources
Flemington-Raritan School District
Mathematics Curriculum

*Temperature- degrees Celsius, degrees Fahrenheit

5. Solve problems involving elapsed time.

4. 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

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

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

Teacher supplement
Website resources

Website resources

*Explore concept of volume

Everyday Mathematics, Lesson 8.2
Teaching Student-Centered Mathematics, Grades K-3, Lovin and Van de Walle, pg 239-240.
<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>
<tr>
<td>1. Recognize, describe, extend and create patterns</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 Geoboards Attribute Blocks Miras, reflection mirrors 3-D Nets Polygon Tiles Wooden 3-D shapes Attribute Bingo Tangram Packet Anglegs</td>
<td><em>Everyday Mathematics</em>, Lesson 1.10, 1.8, 2.10, 7.1, 7.5 Teacher supplement</td>
</tr>
<tr>
<td><em>Using concrete materials (manipulatives), pictures, rhythms, &amp; whole numbers</em></td>
<td></td>
<td></td>
<td>Teacher supplement</td>
</tr>
<tr>
<td><em>Descriptions using words and symbols (e.g., &quot;add two&quot; or &quot;+2&quot;)</em></td>
<td></td>
<td></td>
<td>Teacher supplement</td>
</tr>
<tr>
<td><em>Repeating patterns.</em></td>
<td></td>
<td></td>
<td><em>Everyday Mathematics</em>, Lesson 1.10 Teacher Supplement</td>
</tr>
<tr>
<td><em>Whole number patterns that grow or shrink as a result of repeatedly adding or subtracting a fixed number</em></td>
<td></td>
<td></td>
<td><em>Everyday Mathematics</em>, Lesson 1.1, 1.8, 1.10</td>
</tr>
<tr>
<td><em>Complete number sequences; identify and use number patterns to solve problems.</em></td>
<td></td>
<td></td>
<td><em>Everyday Mathematics</em>, Lesson 1.8</td>
</tr>
<tr>
<td><em>Solve Number Grid Puzzles</em></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Functions and Relationships</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------------------------</td>
<td>--</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| **1. Use concrete and pictorial models of function machines to explore the basic concept of a function.** | **Teacher supplement**  
*Teaching Student-Centered Mathematics, K-3, Lovin and Van de Walle*  
*Complete simple Frames-and-Arrows diagrams.*  
*Complete two rule "Frames-and-Arrows" diagrams*  
*Everyday Mathematics, Lesson 2.11*  
*Ongoing throughout the year*  
*Everyday Mathematics, Lesson 2.10, 3.6*  
*Activities ongoing throughout the year*  
*Elementary School Mathematics with Pizzazz, Creative Publications*  |

<table>
<thead>
<tr>
<th>Modeling</th>
<th></th>
</tr>
</thead>
</table>
| **1. Recognize and describe changes over time (e.g., temperature, height).** | **Teacher supplement**  
*Interpreting pictures, tally charts, pictographs, bar graphs, and Venn diagrams*  
*Collecting daily weather data*  
*Teacher Supplement*  
*Website resources*  |
| **2. Construct and solve simple open sentences involving addition or subtraction.** | **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><strong>Part unknown (e.g., 3 + ___ = 8)</strong></th>
<th></th>
<th>Ongoing activities throughout the year EM Skills Link</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>D. Procedures</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*Commutative (e.g., 5 +3 = 3 + 5)</td>
<td></td>
<td>Teacher Supplement Everyday Mathematics, Lesson 2.4</td>
</tr>
<tr>
<td>*Turn-Around Facts.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>*Zero as the identity element (e.g., 7 + 0 = 7)</td>
<td></td>
<td>Everyday Mathematics, Lesson 2.2 Teacher supplement</td>
</tr>
<tr>
<td>*Associative (e.g., 7 + 3 + 2 can be found by first adding either 7 + 3 or 3 + 2)</td>
<td></td>
<td>Everyday Mathematics, Lesson 10.11 Teacher supplement</td>
</tr>
<tr>
<td>*Introduce the use of parentheses in number models</td>
<td></td>
<td>Everyday Mathematics, Lesson 10.11</td>
</tr>
</tbody>
</table>
Flemington-Raritan School District  
Mathematics Curriculum

Grade: 2  
Standard 4.4 Data Analysis, Probability, and Discrete Mathematics  
Essential Questions: How can classifying help me in organizing data to solve problems?  
How can statistics help us to understand real world situations?  
How can the study of real world data help us understand and make accurate predictions?

<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. Data Analysis</td>
<td></td>
<td></td>
<td></td>
</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  

Everyday Mathematics, Lesson 3.2  
Frog Math,  
Math by All Means: Probability 1-2, Marilyn Burns  
Groundworks Reasoning with Probability, Creative Publications
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
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
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>A. Problem Solving</td>
<td></td>
<td></td>
<td></td>
</tr>
</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  
Exemplars  
Anglegs  
Pattern Blocks  
Attribute Blocks  
3-D Shapes  
MIRA reflection mirrors | 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 |

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

* 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., 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, 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)

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

                              Website resources

                              Teacher supplement

                              Teacher supplement

                              Teacher Supplement

                              Read It! Draw It! Solve It!
                             Best of Math I and II, Exemplars CD
                             Roads to Reasoning, Suzanne Levin
                             Groundworks series, selected activities, Creative Publications
                             Elementary School Mathematics with Pizzazz, Creative Publications
                             Teacher Supplement
                             Everyday Mathematics, Lesson 1.2
* Pictorial representations (e.g., diagrams, charts, or tables)

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

* Graphical representations (e.g., a bar 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-bases laboratory technology for mathematical applications in the sciences (cf. science standards).
### 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>
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>
<th>Knowledge/Skills/Understandings</th>
<th>Assessments</th>
<th>Learning Experiences</th>
<th>Resources</th>
</tr>
</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 |
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

*Read and write commonly used fractions as part of a whole, as a subset of a set, and as a location on a number line

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

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 8.4, 8.5, 9.3

Everyday Mathematics, Lesson 9.13

Everyday Mathematics, Unit 5
Elementary School Mathematics with Pizzazz, Creative Publications
Flemington-Raritan School District  
Mathematics Curriculum

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

*Compare and order commonly used fractions  
*Compare and order other fractions  
*Compare and order decimals

*Identify and use number patterns to solve problems

*Find equivalent names for numbers  
(D/S)

*Convert between mixed numbers and fractions

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

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

Everyday Mathematics, Lesson 5.7  
- 5.9, 5.11

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

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

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

B. Numerical Operations

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

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

   *Complete fact and number families

   *Solve addition and subtraction multi-digit number stories
Flemington-Raritan School District
Mathematics Curriculum

*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 Psyche, 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

Teacher supplement as needed

*Everyday Mathematics, Unit 2
  EM Skills Book
  Website resources

*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?

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<tbody>
<tr>
<td>Building upon knowledge and skills gained in preceding grades, by the end of grade 3, students will:</td>
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<tr>
<td>A. Geometric Properties</td>
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</tbody>
</table>
| 1. Identify and describe spatial relationships of two or more objects in space. | Unit Assessments  
  Do Now/Ticket In/Exit  
  Ticket  
  Teacher Observation  
  Discussion  
  Open Ended Writing Tasks  
  Recognizing Student Achievement sections in Everyday Math 3 | Direct Instruction  
  Collaborative and Cooperative Learning  
  Open Ended Writing Tasks  
  EM Games & Activities  
  Calendar skills  
  Pattern Blocks  
  Cuisenaire Rods  
  Tangrams  
  Geoboards  
  Geosolids  
  Polygon Tiles  
  Balance/Scale/Weights  
  Master Rulers  
  Mira (mirrors) | Teaching Student-Centered Mathematics, Grades K-3, Grades 3-5, Lovin and Van DeWalle, page 42-43, 245 |

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

EM Project 2: Using a Magnetic Compass centimeter cubes

Teacher supplement
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

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

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- *Everyday Mathematics* Lesson 3.5, 3.9, 5.6, 6.4-6.6, 6.11, 6.12, 7.9, 9.10, 10.2-10.5
- *Groundworks for Geometry*, Creative Publication
- *Shapes, Shapes, Shapes*, Tana Hoban
- *Anno’s Magic Seeds*, Mitsumasa Anno
- *Everyday Mathematics*, Lesson 6.4, 9.10
- *Website resources*
- *Everyday Mathematics*, Lesson 6.5
- *Everyday Mathematics*, Lesson 6.6
- *Everyday Mathematics*, Lesson 6.11, 6.12, 10.2
- *Elementary School Mathematics with Pizzazz*, Creative Publications
- *The Greedy Triangle*, Marilyn Burns
- *Everyday Mathematics*, Lesson 7.9
- *Everyday Mathematics*, Lesson 6.10
- *Teacher created materials*
- *Teacher supplements*
- *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

Everyday Mathematics Lesson 3.8

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

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

Draw angles as records of rotations

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

Identify right angles Everyday Mathematics Lesson 6.3, 6.7, 6.8, 7.9

Everyday Mathematics Lesson 6.3, 6.7, 11.4

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

Everyday Math Lesson 6.6

Teacher supplement

B. Transforming Shapes

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

District-made teacher packet

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

Navigations in Geometry, grades 3-5, NCTM

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

EM Project 3: Illusions

Everyday Math Unit 6

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

**Grade: 3**

**Standard 4.3 Patterns and Algebra**

**Essential Question:** How can patterns help in problem solving?  
How can symbols be used to help us in problem solving?  
How does the study of algebra help us understand mathematical patterns as the patterns found in nature and the real world?

<table>
<thead>
<tr>
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<tbody>
<tr>
<td><strong>A. Patterns</strong></td>
<td></td>
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</tr>
</tbody>
</table>
| 1. Recognize, describe, extend, and create patterns. | Unit Assessments  
Do Now/Ticket In/Exit Ticket  
Teacher Observation  
Discussion  
Open Ended Writing Tasks  
Recognizing Student Achievement sections in Everyday Math 3 | Direct Instruction  
Collaborative and Cooperative Learning  
Open Ended Writing Tasks  
EM Games & Activities  
Calendar skills  
Pattern Blocks  
Cuisenaire Rods  
Tangrams  
Geoboards  
Geosolids  
Polygon Tiles  
Balance/Scale/Weights  
Master Rulers  
Mira (mirrors) | *Everyday Mathematics, Lesson 1.12, 2.3, 7.1, 9.4*  
*Navigations in Algebra, grades 3-5, NCTM* |

*Descriptions using words and number sentences/expressions*

*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*

*Groundworks, Creative Publications*

*Everyday Mathematics, Lesson 2.3*

*Everyday Mathematics, 7.1, 7.6, 9.1*

*Calculator TI 108*
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

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).

D. Procedures

1. Understand and apply the properties of operations and numbers.
*Commutative (e.g., 3 x 7 = 7 x 3)
*Turn-around facts
*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?

<table>
<thead>
<tr>
<th>Knowledge/Skills/Understandings</th>
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</tr>
</thead>
<tbody>
<tr>
<td>A. Data Analysis</td>
<td></td>
<td></td>
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</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) | * Data collected from the classroom environment  
*Find the median of a data set  
*Make a frequency table  
*Find the mean of a data set | Everyday Mathematics, Lesson 5.12, 10.6  
Everyday Mathematics, Lesson 1.5, 10.6  
Website resources  
Everyday Mathematics, Lesson 1.5, 10.9  
Everyday Mathematics, Lesson 1.5, 1.10, 10.6, 10.8  
Exemplars, Best of Math I and II CD  
Teaching Student-Centered Mathematics, Grades 3-5, Lovin and Van de Walle, page 326  
Teacher supplement |
*Find the mode of the set of data

Find the range of data

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

*Pictograph, bar graph, 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

*more likely, less likely, equally likely

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

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

District Teacher-Made Probability worksheets
Everyday Mathematics, Lesson 11.3, 114, 11.5
Navigation with Data and Probability in Grades 3-5, NCTM

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.

District Teacher-Made Worksheets
Website resources

District Teacher-Made Map Coloring worksheets
Website resources
Flemington-Raritan School District
Mathematics Curriculum

Grade: 3  Standard 4.5 Mathematical Processes

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

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

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

Best of Math I and II, Exemplars CD  
Groundworks, Creative Publications  
Everyday Mathematics, All units -Open Response question

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

2. Use connections among mathematical ideas to explain concepts (e.g., two linear equations have a unique solution because the lines they represent intersect at a single point).
   - Everyday Mathematics Activities, ongoing throughout the year
   - Best of Math II, Exemplars CD
   - Navigation Series, NCTM selected problems
   - Sample NJASK Open-ended problems
   - Groundworks, Creative Publications

3. Recognize that mathematics is used in a variety of contexts outside of mathematics
   - Everyday Mathematics Activities, ongoing throughout the year
   - Best of Math I and II, Exemplars CD
   - Website resources for "real world" applications of mathematics

4. Apply mathematics in practical situations and in other disciplines
   - Everyday Mathematics- Activities, on-going throughout the year
   - Best of Math I and II, Exemplars CD
   - Navigation Series, NCTM selected problems
   - Teacher supplement with assorted problems from Website resources, newspapers, children’s literature and professional magazines

5. Trace the development of mathematical concepts over time and across cultures (cf. world languages and social studies standards).
   - Social Studies unit on timelines
   - Teacher supplement with Website and media center resources
   - Science: Space timeline
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
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)
Flemington-Raritan School District
Mathematics Curriculum

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

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

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

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

Teacher supplement
Best of Math I and II, Exemplars CD
NavigationSeries, NCTM selected problems
Website resources for Open-ended problems
NJ Mathematics Curriculum Frameworks, selected activities for grades 3-4

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

Everyday Mathematics activities, ongoing throughout the year
Website resources: e.g., National Library of Virtual Manipulatives
Elementary School Mathematics with Pizzazz, Creative Publications
Navigation Series, NCTM selected problems

F. Technology

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

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

*Introduce memory keys on a calculator

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
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<th>Number of Days (approximate)</th>
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<td>8 - Perimeter &amp; Area</td>
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<td>9 - Fractions, Decimals, &amp; Percents</td>
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<td>4 - Decimals</td>
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<td>10 - Reflections &amp; Symmetry</td>
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Flemington-Raritan School District
Mathematics Curriculum

Grade: 4  Standard 4.1 Number and Numerical Operations
Essential Question: How can problems in the real world be solved with mathematics?
How can estimation be useful to us?
How do numbers help us reason out solutions to problems?
How do basic operations help us understand numbers?

Knowledge/Skills/Understandings          Assessments           Learning Experiences          Resources

A. Number Sense

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

   Unit Assessments
   Do Now
   Teacher Observation
   Discussion
   Open Ended Writing Tasks
   Recognizing Student Achievement sections in Everyday Math 3
   Direct Instruction
   Collaborative and Cooperative Learning
   Open Ended Writing Tasks
   Games
   Base Ten Blocks
   Digi-blocks
   Pattern Blocks
   Place value mat or chart
   Fraction pieces
   Fraction Circles
   Cuisenaire Rods
   Tangrams
   Geoboards

* 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

How Much is a Million?, (book & video)
David Schwartz
If You Made a Million, David Schwartz
*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.
2. Demonstrate an understanding of place value concepts.

* Practice place-value skills through a calculator routine
  *Develop the concept of rounding

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

4. Understand the various uses of numbers.

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

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

*Identify the whole for fractions

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

6. Compare and order numbers.

* Compare large numbers
*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

Everyday Mathematics, Lesson 7.1
Teacher supplement

Everyday Mathematics, Lesson 10.6, 11.6
Visit the Statue of Liberty, Nathan Zimelman (Social Studies link)

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

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

Exemplar: Lost Count (Farmer Brown)

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

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
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
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?

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<td>1. Identify and describe spatial relationships of two or more objects in space.</td>
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<td>Geometric solids</td>
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<td>Polygon tiles, tangrams, pattern blocks</td>
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<td>Mira/ Transparent Mirror</td>
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<td>Master Rulers</td>
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<td>MIRA –transparent mirrors</td>
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<td>Project 6: Building &amp; Viewing Structures</td>
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*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
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

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

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

*Vertex, edge, face, side, angle

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

Everyday Mathematics, Unit 1

Everyday Mathematics, Lesson 1.2 - 1.5

Teacher supplement

Everyday Mathematics, Lesson 1.6, 1.7, 1.8

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

Everyday Mathematics, Lesson 1.5

The Greedy Triangle, Marilyn Burns

Everyday Mathematics, Unit 11

Everyday Mathematics Lesson 11.2, 11.3

National Library of Virtual Manipulatives Library Website

Shapes, Shapes, Shapes, Tana Hoban

NJ Mathematics Curriculum Framework, Grades 3-4, selected activities
Inclusive relationships -- squares are rectangles, cubes are rectangular prisms

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

*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: ll and \( \perp \))

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

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

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

Everyday Mathematics, Lesson 10.2 - 10.4
Website resources
Everyday Mathematics, Lesson 10.1, 10.2, 10.3,
Shadows and Reflections, Tana Hoban
Round Trip, Ann Jonas
Reflections, Ann Jonas

Everyday Mathematics, Lesson 1.2, 1.7
Teacher supplement with perpendicular practice
Introduce symbols for parallel and perpendicular
*Everyday Mathematics, Lesson 1.4

*Everyday Mathematics, Lesson 1.3, 6.7
Grandfather Tang's Story, Ann Tompert

*Everyday Mathematics, Lesson 6.7

*Everyday Mathematics, Lesson 6.6, 6.7

*Everyday Mathematics, Lesson 1.3, 6.5, 6.7

Navigations through Geometry in grades 3-5, NCTM

*Define a circle, explore designs with circles
(concentric circles, nonconcentric circles)

Pi Day

*Everyday Mathematics Lesson 1.6, 1.7
Ed Emberley's Picture Pie: A Circle Drawing Book, Ed Emberley

*Everyday Mathematics, Lesson 10.5

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

B. Transforming Shapes

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

*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.

Everyday Mathematics Lessons Unit 10
Elementary School Mathematics with Pizzazz, Creative Publications
Grandfather's Tang Story, Tompert

Everyday Mathematics Lessons Unit 10

Everyday Mathematics, Lesson 6.5

Project 4: Making a Quilt

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

Everyday Mathematics, Unit 4 activities
Groundworks for Measurement, Creative Publications
Illuminations Website

Teacher supplement
Everyday Mathematics, Lesson 4.8, 4.9, 4.10
Groundworks-Reasoning with Measurement, Creative Publications

About Teaching Mathematics, M. Burns
Everyday Mathematics, Unit 4, 8.1, Teacher supplement
Elementary School Mathematics with Pizzazz, Creative Publications

Everyday Mathematics, Lesson 8.3, 8.4, 8.5, 8.6, 8.7, 8.8
Exemplar: Stain Glass Window

Inchworm and a Half, E. Pinczes
EDM Unit 8

Everyday Mathematics, Lesson 4.10
Teacher supplement

Everyday Mathematics, Lesson 11.4, 11.5
Science: Matter Unit D

Everyday Mathematics, Lesson 11.7
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

- Gallon Man
- Gallon Game

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

Everyday Mathematics, Lesson 4.9
Teaching Student Centered Mathematics, Grades 3-5, Lovin and VanDeWalle, page 278-280
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.
**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>
<th>Assessments</th>
<th>Learning Experiences</th>
<th>Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Patterns</td>
<td></td>
<td></td>
<td>Everyday Mathematics, Lesson 10.5</td>
</tr>
<tr>
<td>1. Recognize, describe, extend, and create patterns.</td>
<td>Unit Assessments Do Now Teacher Observation Discussion Open Ended Writing Tasks Recognizing Student Achievement sections in Everyday Math 3</td>
<td>Hundreds Grid Direct Instruction Collaborative and Cooperative Learning Open Ended Writing Tasks Tinkerplots Software Geometer’s Sketchpad Software Games</td>
<td>Navigations through Algebra 3-5, NCTM Teaching Student-Centered Mathematics, Grades 3-5, Lovin and Van DeWalle, page 293 Teacher Supplement Illuminations website Teaching Student-Centered Mathematics, Grades 3-5, Lovin and Van DeWalle, page 294</td>
</tr>
</tbody>
</table>
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
*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 x 6 = _____, n = 15 ÷ 3, 3 x _____ = 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 x 7 = 7 x 3)
   "Turn around property" order does not change an answer

*Identity element for multiplication is 1 (e.g., 1 x 8 = 8)

*Associative (e.g., 2 x 4 x 25 can be found by first multiplying either 2 x 4 or 4 x 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 ( =, <, > )

Teaching Student-Centered Mathematics, Grades 3-5, Lovin and VanDeWalle, page 66
Teacher-made supplements

Teaching Student-Centered Mathematics, Grades 3-5, Lovin and VanDeWalle, page 66
Teacher-made supplements

Everyday Mathematics, Lesson 3.9

Everyday Mathematics, Lesson 3.10

Everyday Mathematics, Lesson 3.8
Elementary School Mathematics with Pizzazz, Creative Publications
Flemington-Raritan School District
Mathematics Curriculum

Grade: 4 Standard 4.4 Data Analysis, Probability, and Discrete Mathematics

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

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>A. Data Analysis</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></td>
<td>*Data generated from the school environment</td>
<td>Project 5: Which Soft Drink is the Best Buy?</td>
<td>Navigations through Data Analysis and Probability, 3-5, NCTM Teaching Student Centered Mathematics 3-5, Lovin and Van De Walle, page 321</td>
</tr>
<tr>
<td>2. Read, interpret, select, construct, analyze, generate questions about and draw inferences from displays of data.</td>
<td>*Pictograph, bar graph, line plot, line graph, table</td>
<td>* Display data in a line plot</td>
<td>Everyday Mathematics Unit 2, 5.11 Teaching Student-Centered Mathematics, Grades 3-5, Lovin and Van De Walle, page 329</td>
</tr>
<tr>
<td></td>
<td>*Average (mean), most frequent (mode), middle term (median)</td>
<td></td>
<td>Everyday Mathematics, Lesson 2.8, 9.6 Illuminations website</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Teaching Student Centered Math 3-5, page 326-328, LouAnn Lovin and John Van De Walle</td>
<td></td>
</tr>
</tbody>
</table>
Flemington-Raritan School District
Mathematics Curriculum

* Use the statistical landmarks of maximum and minimum number and range in a set of data

B. Probability

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

PIG, The Two-Dice Sum Game

Everyday Mathematics, Lesson 2.5
District Teacher-Made Packet of Probability worksheets
About Teaching Mathematics, Marilyn Burns, page 70, 71, 73, 74
Groundworks-Reasoning with Data and Probability, Creative Publications

Everyday Mathematics, Lesson 7.11, 7.12
District Teacher-Made Probability worksheets

*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

Everyday Mathematics

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

Everyday Mathematics, Lesson 7.11, 7.12
District Teacher-Made Probability worksheets

Everyday Mathematics, Lesson 7.11, 7.12
District Teacher-Made Probability worksheets

Math by All Means, Probability 3-4, Marilyn Burns

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District Teacher-Made Probability worksheets

Math by All Means, Probability 3-4, Marilyn Burns

*What students think will happen (intuitive)
*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”
*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

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

NJ Mathematics Curriculum Framework, selected activities for grades 3-4
District teacher-made worksheets

*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
Grade: 4 Standard 4.5 Mathematical Processes

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

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

Knowledge/Skills/Understandings | Assessments | Learning Experiences | Resources
--- | --- | --- | ---
A. Problem Solving
1. Learn mathematics through problem solving inquiry and discovery
   - Unit Assessments
   - Do Now
   - Teacher Observation
   - Discussion
   - Open Ended Writing Tasks
   - Recognizing Student Achievement sections in Everyday Math 3
   - Direct Instruction
   - Collaborative and Cooperative Learning
   - Open Ended Writing Tasks
   - EM Games
   - Illuminations website
   - 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
Flemington-Raritan School District
Mathematics Curriculum

*Non-routine problems

Grades 3-4, Standard 1: Problem Solving
Exemplars, Best of Math I and II, CD
Website resources

*Problems with multiple solutions

Exemplars, Best of Math I and II CD
Website Resources
Groundworks, Creative Publications

Problems that can be solved in several ways

Rain Forest, Barbara Taylor
Best of Math I and II, Exemplars CD
"Shopping for Shoes", "Skating Trip"

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

Everyday Mathematics, Lesson 3.7, 3.11, 6.1, 6.3
National Geographic Atlas for Young Explorers, National Geographic Society
Exemplars, Best of Math I and II CD
NJ Mathematics Curriculum Frameworks, selected activities
Website resources
Guinness Book of World Records

4. Pose problems of various types and levels of difficulty

Everyday Mathematics Problem solving: verbal, pictorial, concrete and symbolic,
Everyday Math – all unit “Readiness” and “Enrichment” activities
Scholastic Kid's Almanac for 21st Century, E. Pascoe and D. Kops
Website resources
Teacher supplement – tiered worksheets
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).

EM Project 7: Numbers, Mayan Style
Website / Media Center resources

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

EM Project 4: Making a Quilt

D. Reasoning

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

Math Curse, Jon Scieska
Teacher supplement
NJ Mathematics Curriculum Framework activities
Teaching Student-Centered Mathematics, Grades 3-5, Lovin and VanDeWalle, Chapter 1
Website resources

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

Project 3: A Carnival Game
Illuminations website
Website Resources
NJ Sate Rubric
Best of Math I and II, Exemplars CD

* Develop reasoning skills

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

Best of Math I and II, Exemplars CD Sample
Open-Ended Problems from website resources
Teacher supplement
4. Rely on reasoning, rather than answer keys, teachers, or peers, to check the correctness of their problem solutions.

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

5. Make and investigate mathematical conjectures.
*Counterexamples as a means of displaying conjectures

Teacher supplement
Best of Math I and II, Exemplars CD
Sample Open-Ended Problems from Website resources
NJ Mathematics Curriculum Frameworks

*Verifying conjectures using informal reasoning or proofs.

Teacher supplement
Best of Math I and II, Exemplars CD
Sample Open-Ended Problems from Website resources
NJ Mathematics Curriculum Frameworks

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

Teacher supplement with website resources

E. Representations

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

Everyday Mathematics activities ongoing throughout the year
Teacher supplement
Groundworks, Creative Publications

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

Everyday Mathematics activities ongoing throughout the year
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).
<table>
<thead>
<tr>
<th>Unit</th>
<th>Number of Days (approximate)</th>
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</tr>
</thead>
<tbody>
<tr>
<td>1- Number Theory</td>
<td>12</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 Ratios</td>
<td>15</td>
</tr>
<tr>
<td>4 - Division</td>
<td>10</td>
<td>10. Using Data; Algebra Concepts and Skills</td>
<td>12</td>
</tr>
<tr>
<td>5. Fractions, Decimals, and Percents</td>
<td>15</td>
<td>11 - Volume</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>
<tr>
<td>Mid-Year Benchmark Assessment</td>
<td>1</td>
<td>End-of-the-Year Benchmark Assessment</td>
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</table>
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?

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<tbody>
<tr>
<td><strong>A. Number Sense</strong></td>
<td></td>
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</table>

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).

- Whole numbers through millions (Grade 4 secure)
  
  * Demonstrate an understanding of place value concepts.
  
  * Know place value to billions
  
  * Know place value to hundredths
  
  * Understand the relative size of 1 million, 1 billion, 1 trillion

  Teacher Observation/RSA (Recognizing student achievement); Test/Quiz; Exit tickets

  Place Value Puzzle
  Literature Link
  Journal pages and math boxes

  EM Activity: Place Value Puzzles
  Place Value Poster
  Everyday Mathematics, Lesson 2.10, 3.2.

  Use real numbers: house prices, stock market daily volume, bank account, profit / loss statements for companies, tax obligations

  Everyday Mathematics, Lesson 2.10

  Math Game: Number Top It

  Everyday Mathematics, Lesson 2.10
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

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

- EM Game: First to 100, Estimation Squeeze, Multiplication Bullseye. Discuss data used for circle graphs
- EM Activity: Magnitude Estimates
- Explore division with base ten blocks
- EM Game: 2-4-5-10 Fractional Tic-Tac-Toe (Decimal Version)
- Everyday Mathematics, - 5 Lesson 2.10, 4.3
- How Much is a Million?, by David Schwartz
- Everyday Mathematics , Unit 2
- Everyday Mathematics, Unit 4
- Everyday Mathematics, Unit 5
- Middle School Mathematics with Pizzazz, selected activities
- Sketchpad: Fraction tiles, Comparing Fractions, Feed the Mouse.
- Everyday Mathematics, Lesson 8.1, 8.7, 8.9
- EM Probability Meter Poster

- Use 10 x 10 grids, fraction stick chart, decimal number line
- Writing equivalent fractions using 10 or 100 as denominators before writing decimals
- Find decimal equivalents before being allowed to use the calculator for converting fractions to decimals.
- Discuss terminating versus repeating decimal numbers
- Encourage students to find numerical patterns for decimal equivalents
- Everyday Mathematics, Unit 5.4
- Middle School Mathematics with Pizzazz, selected activities
- Sketchpad: Fraction tiles, Comparing Fractions, Feed the Mouse.
- Everyday Mathematics, Lesson 8.1, 8.7, 8.9
- EM Probability Meter Poster
| **Flemington-Raritan School District**  
| **Mathematics Curriculum** |
| *Find decimals between pairs of numbers* | Evaluation of written response with reasoning  
|  | Do Now, Exit Ticket  
|  | EM Game: Estimation Squeeze  
|  | Provide opportunities for multiple step problems in open-ended format  
|  | Everyday Mathematics, Lesson 8.4, 8.5  
|  | Balloon target website.  
|  | Sketchpad: Zooming Decimals |
| *Convert among fractions, decimals and percents.* | EM Unit 5 checking progress  
|  | EM Game: Fraction / Percent Concentration, 2-4-5-10 Frac-Tac-Toe (Percent Version, Bingo Version)  
|  | Everyday Mathematics, Unit 5, 8.7, 8.9, 8.10  
|  | Sketchpad: Stretchy Percent Ruler. |
| *Convert between fractions and mixed or whole numbers.* | Use games, allow students to explore with manipulatives or models  
|  | Everyday Mathematics, Lesson 5.2, 8.12 |
| *Convert between decimals, fractions and mixed numbers* | Use games, allow students to explore with manipulatives or models  
|  | Everyday Mathematics, Lesson 5.6, 5.8, 5.10, 5.11, 8.8  
|  | Middle School Mathematics with Pizzazz, Creative Publications, selected activities |
| *Find common denominators* | Provide opportunities for students to find strategies for finding common denominators  
|  | Everyday Mathematics, Lesson 6.9, 6.10  
|  | Website resources  
|  | Sketchpad: Open the Safe |
| *Find equivalent fractions* | Provide opportunities for students to explore equivalencies using paper folding and diagram modeling as well as use of other manipulatives or models  
|  | Everyday Mathematics, Lesson 5.4, 6.9, 6.10  
|  | Teacher supplement |
| *Finding a fraction of a number* | Provide opportunities for students to model sets, paper fold and use other manipulatives including number line  
|  | Everyday Mathematics, Lesson 5.1, 5.2, 8.4, 8.5  
|  | EM Bulletin Board of Fraction of a Fraction examples |
| *Explore meaning of and purpose of percent* | Explore meaning of percent that makes sense to students, comparison of different units e.g., grades, percent as a number representation of a whole e.g., 25% of $10 not the same as 25% of $1 000 | Everyday Mathematics, Unit 5  
Teaching Student-Centered Mathematics, Grades 3-5, Lovin and Van de Walle. |
| *Find percent of a number* | Discuss various ways to find percent of a number  
Provide multiple opportunities to find most efficient method.  
EM Activity: American Tour Populations: rural and urban | Everyday Mathematics, Unit 5, Lesson 8.9, 8.11 |
| *Practice finding the whole, given a fraction or percent of the whole* | same as 25% of $1 000  
Provide opportunities to model using manipulatives | Everyday Mathematics, Lesson 5.1, 5.2, 6.5, 8.10 |
| *Review concept of rates; represent rates with formulas, tables, and graphs* | Graphically explore rates: discuss continuous and discrete quantities,  
Demonstrate Distance, speed and time using CBR and graphing calculator | Everyday Mathematics, Lesson 10.4, 10.6  
Website resources  
CBR / graphing calculator |
| 5. Develop and apply number theory concepts in problem solving situations. | EM Game: Advanced Factor Captor  
EM Project 2: "Deficient, Abundant, & Perfect | Everyday Mathematics, Unit 1 and activities ongoing throughout the year  
NJ Mathematics Curriculum Framework for grades 5-6, selected activities  
NJ State rubric  
Teacher supplement with Logic Number Problems  
Sketchpad: Mystery Number  
Teacher-made supplement (review skill from earlier grade) |
| *Identify even and odd numbers* | EM Unit 1 checking progress Have students tell why number is even or odd Numbers* | 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) |
• Primes, factors, multiples

Project 1: The Sieve of Eratosthenes

Everyday Mathematics, Unit 1
Middle School Mathematics with Pizzazz, selected activities, Creative Publications
Teacher supplement
Sketchpad: Combination Locks, Factor Puzzles.

ind and 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.

Everyday Mathematics, Unit 1, 12.1

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

Middle School Mathematics with Pizzazz, selected activities
Teacher supplement

entify prime and composite numbers
Explore array strategy for finding primes

Everyday Mathematics, Lesson 1.6

*Find the greatest common factor of two numbers
Provide examples using prime factorization

Everyday Mathematics, Lessons 12.1
Teacher supplement using other resource
Sketchpad: Combination Locks.

*Find the least common multiple of two numbers
Provide examples using prime factorization

Everyday Mathematics, Lessons 12.1
Teacher supplement
Sketchpad: Combination Locks.

*Represent square numbers as arrays and as numbers written as exponents

Everyday Mathematics, Lesson 1.7

ind the square root of a square number
Refer to square root as un squaring a number: use squeeze method

Everyday Mathematics, Lesson 1.8
**Flemington-Raritan School District**  
**Mathematics Curriculum**

| *Explore rates* | Provide opportunities to solve number stories using rates |
| *Explore uses of ratios and way of expressing ratios* | Provide opportunities to explore ratios in everyday life; model and solve problems involving ratios of part to whole relationship and number stories |
| *Solve rate story problems* | EM Activity: Find your Heart Rate. Provide multiple opportunities to model using manipulatives, discuss rate tables, and explore relationships between numbers using rate stories |
| *Introduce cross multiplication for solving ratio problems (proportions)* | Practice setting up equivalent ratios that yield the same solutions. |
| 6. Compare and order numbers. | Explore practical uses for negative numbers: golf scores, football gains and losses, having and owing money, above and below sea level, stock market |
| *Order and compare positive and negative numbers* | * Use number line |

**Everyday Mathematics, Lesson 12.1**  
Teacher supplement  
Website resources  
Teaching Student-Centered Mathematics in grades 3-5, 5-8, Lovin and Van de Walle  
* Everyday Mathematics, Lesson 12.3, 12.4, 12.5  
* Teacher supplement  
* Middle School Mathematics with Pizzazz, Creative Publications  
* NJ Mathematics Curriculum Framework in grades 5-6, selected activities  

**Everyday Mathematics, Lesson 12.5**  
Teacher supplement  
Middle School Mathematics with Pizzazz, Creative Publications  
* Website resources

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

**Everyday Mathematics, Lesson 12.9, 12.10, 12.11**  
Teacher supplement  
Middle School Mathematics with Pizzazz, Creative Publications  
Website resources

**Everyday Mathematics, Lesson 3.2, 4.6**

**Everyday Mathematics, Lesson 2.10, 5.3, 7.7**  
Sketchpad: Jump Along.
*Explore \(-x\) as the "opposite of \(x\)" since \(x\) may be a positive or negative number

*Order and compare fractions
Use 0, 1/2 and 1 as benchmarks. Provide students with fraction pieces, stick chart or number line to support their ordering. 

*Understand and apply exponential notation
Introduce calculator keys A and y to the x

*Introduce number and word notation for large numbers
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?

*Introduce exponential notation for powers of 10
Explore relative size of numbers when distinguishing between positive and negative exponents for powers of ten.

*Understand and apply scientific notation
Explore uses of scientific notation, find examples on the Internet.

Literature Link
While calculators may differ, introduce using scientific notation on a calculator for discussion purposes. 

Super Source with Cuisenaire series, Marilyn Burns

Everyday Mathematics, Lesson 5.3, 8.1

Everyday Mathematics, Lesson 7.1, 7.2, 7.3

Everyday Mathematics, Lesson 7.1, 7.2, 7.3

Everyday Mathematics, Lesson 7.1, 7.2, 7.3

Everyday Mathematics, Lesson 7.3

Teacher supplement; Website resources

The King's Chessboard, David Birch
Flemington-Raritan School District
Mathematics Curriculum

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

<table>
<thead>
<tr>
<th>* Demonstrates proficiency in basic facts for addition and subtraction and multiplication and division</th>
</tr>
</thead>
<tbody>
<tr>
<td>EM Unit 1 Checking Progress</td>
</tr>
<tr>
<td>District Timed tests: 50 facts in two minutes</td>
</tr>
<tr>
<td>* Draw arrays to model multiplication</td>
</tr>
<tr>
<td>EM Unit 1 Checking Progress</td>
</tr>
<tr>
<td>District Timed tests: 50 facts in two minutes</td>
</tr>
<tr>
<td>* Find the quotient and remainder of a whole number divided by a 1-digit whole number</td>
</tr>
<tr>
<td>EM Unit 4 Checking Progress</td>
</tr>
<tr>
<td>District Timed tests: 50 facts in two minutes</td>
</tr>
<tr>
<td>* Find the quotient and remainder of a whole number divided by a 2-digit whole number</td>
</tr>
<tr>
<td>EM Unit 4 Checking Progress, Part B.</td>
</tr>
<tr>
<td>District Timed tests: 50 facts in two minutes</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>
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

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

- Provide practice appropriate to student need
- Provide class competitions Teacher supplement
- Use appropriate numbers and monitor student use
- Discuss answer interpretations EM Game: Beat the Calculator
- Website resources
<table>
<thead>
<tr>
<th>Task</th>
<th>Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>* Find the sum and difference of multi-digit whole numbers and decimals</td>
<td>Assess place value using EM whole class discussion. Review various algorithms for adding and subtracting numbers, include traditional EM Games: Addition Top IT, Subtraction Target Practice.</td>
</tr>
<tr>
<td></td>
<td>* Find the product of multi-digit whole numbers, fractions, and decimals</td>
</tr>
<tr>
<td>* Use an algorithm to add and subtract mixed numbers</td>
<td>EM Unit 2, Checking progress</td>
</tr>
<tr>
<td>* Add and subtract fractions with common denominators</td>
<td>EM Unit 5, 6 checking progress</td>
</tr>
<tr>
<td>* Add and subtract fractions with unlike denominators</td>
<td>EM Unit 5, 6 checking progress</td>
</tr>
</tbody>
</table>
* Use area model for fraction multiplication

* Use an algorithm to multiply fraction, whole number and mixed numbers by a fraction of same

* Find the quotient for dividing a whole number by a whole number

* Introduce strategy for dividing fractions

3. Use an efficient and accurate pencil-and-paper procedure for division of a 3-digit number by a 2-digit number.

* Use a divisibility test to determine if a number is divisible by another number.

* Interpret the remainder in division number stories

<table>
<thead>
<tr>
<th>Activity</th>
<th>Progress</th>
<th>Resource</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper folding</td>
<td>EM Unit 8 checking progress, Part B.</td>
<td>Everyday Mathematics, Lesson 8.5</td>
</tr>
<tr>
<td>Student should understand reasons behind multiplication algorithm: provide ample opportunities for modeling using manipulatives EM Game: Fraction/Whole Number Multiplication Top It</td>
<td>EM Unit 4 checking progress</td>
<td>Everyday Mathematics, Lesson 8.5, 8.6, 8.7, 8.8, 8.10</td>
</tr>
<tr>
<td>Review partial-quotients algorithm and traditional method. Encourage good estimating</td>
<td>EM Unit 4 checking progress</td>
<td>Everyday Mathematics, Lesson 4.1, 4.2, 4.4</td>
</tr>
<tr>
<td>Provide opportunities for discussion and understanding, use manipulatives and models</td>
<td>EM Unit 4 checking progress, Part B.</td>
<td>Everyday Mathematics, Lesson 8.12</td>
</tr>
<tr>
<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>
<td>EM Unit 4 checking progress, Part B.</td>
<td>Everyday Mathematics, Lessons 4.2, 4.4, 4.5, 4.6 Middle School Mathematics with Pizzazz, selected activities</td>
</tr>
<tr>
<td>Enrichment: Exploring a Divisibility test EM Activity: Divisibility Tests</td>
<td></td>
<td>Everyday Mathematics, Lesson 1.5 Middle School Mathematics with Pizzazz, Creative Publications, selected activities</td>
</tr>
<tr>
<td>Provide visual representation of division using diagrams or models EM Activity: Solving division stories with remainders</td>
<td>EM Unit 4 checking progress</td>
<td>Everyday Mathematics, Lesson 4.6 Website resources</td>
</tr>
<tr>
<td>Task</td>
<td>Resource/Activity</td>
<td></td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Divide decimal numbers by whole numbers with no remainders (B/D)</td>
<td>* Provide opportunities for students to estimate answer before calculating solution</td>
<td></td>
</tr>
<tr>
<td>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.</td>
<td>* Supplemental enrichment activities</td>
<td></td>
</tr>
<tr>
<td>* Solve number stories (addition and subtraction) (S)</td>
<td>* Provide models of number stories including open sentences</td>
<td></td>
</tr>
<tr>
<td>5. Check the reasonableness of results of computations.</td>
<td>* Always remind student to ask &quot;Does this answer make sense?&quot;</td>
<td></td>
</tr>
<tr>
<td>6. Understand and use the various relationships among operations and properties of operations.</td>
<td>* Create and explore patterns for squares and square roots</td>
<td></td>
</tr>
<tr>
<td>• Understand how square numbers and their square roots are related</td>
<td>* Use visual representations: geoboard</td>
<td></td>
</tr>
<tr>
<td></td>
<td>* Introduce square root as the undo of squaring</td>
<td></td>
</tr>
</tbody>
</table>
### C. Estimation

1. **Use a variety of estimation strategies for both number and computation.**
   - Provide multiple opportunities for students to explore relationships and use as problem solving strategy.
   - Encourage: Does this make sense? How can I use this information to help solve other problems?

   - Make magnitude estimates for product of multi-digit numbers, including decimals.
   - Provide ongoing opportunities for student guesses in estimation jars filled with a variety of objects.

2. **Recognize when an estimate is appropriate, and understand the usefulness of an estimate as distinct from an exact answer.**
   - EM Activity: Estimation
   - EM Activity: Estimate Reaction Time
   - EM Activity: American Tour: Population estimates
   - Literature Link
     - Everyday Mathematics, Lesson 2.1, 2.5.
Flemington-Raritan School District
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* 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.

Literature Link
How Much is a Million?, David Schwartz

3. Determine the reasonableness of an answer by estimating the result of operations.

EM Unit 2 checking progress
Provide opportunities to practice estimation prior to computation
Encourage good estimates and define key numbers to use

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

Multiplication Bulls Eye.

Everyday Mathematics, Lesson 2.10, 9.7
Website resources for real data numbers

Everyday Mathematics, Lesson 2.1, 2.5, 2.7

Everyday Mathematics, Lesson 2.1, 2.7
### Grade: 5  
**Standard 4.2 Geometry and Measurement**

**Essential Questions:** How can knowledge of geometric properties help in problem solving situations?  
How can coordinate grid systems help in understanding locations?  
How does the mathematics of geometry enable us to wonder and understand our natural and physical world?

<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>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| 1. Understand, apply, and identify concepts involving lines and angles. | Teacher Observation/RSA (Recognizing Student Achievement)  
Test/Quiz  
Exit Ticket | Provide hands-on models  
Discuss and model appropriate examples | *Everyday Mathematics* Unit 3  
Website resources |
| • Notation for line, ray, angle, line segment | | | |
| • Properties of parallel, perpendicular, and intersecting lines | | | *Everyday Mathematics*, Lesson 3.4, 3.5  
*Everyday Mathematics*, Lesson 3.5, 9.6 |
| • Sum of the measures of the interior angles of a triangle is 180° | | | *Everyday Mathematics*, Lesson 3.9  
Website resources |

*Find the sum of the measures of the angles in any polygon*
*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
compass
Geomter's Sketchpad

"Geodeo's Sorting Scheme"

Geometry solids, Polygon tiles
EM Game: Polygon Capture

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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

Everyday Mathematics, Lesson 3.7, 3.9
Illuminations website

Everyday Mathematics, Lesson 3.6
Website resources

Everyday Mathematics, Lesson 9.5, 9.6

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3. Identify similar figures.
Use Problems for the
Geometry Template;
Explore angle measures and
side lengths, discuss
relationships;
Show examples and non
examples for definition "same
shape different size"

* Know the properties of geometric solids
Use or create geosolid
models
EM Game: 3-D Shape Sort,
EM Activity: polyhedral Dice,
EM Activity: Cube pattern,
EM Activity: rectangular
Prism Pattern,

Identify faces, vertices and edges
(Grade 4 secure)
Use geosolids models
Literature Link

B. Transforming Shapes
3. Understand and apply the concepts of
congruence and symmetry (line and
rotational).
EM Study Link 9.3 (reflection)
Look for congruent and
similar shapes in wallpaper,
fabric, art

* Know the properties of geometric solids
Everyday Mathematics, Lesson 3.10
Teacher supplement
Sketchpad: Sliding Shapes

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

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

Everyday Mathematics, Lesson 11.1, 11.2
Website resources

Everyday Mathematics, Lesson 3.10
Teacher supplement
Sketchpad: Sliding Shapes

* Know the properties of geometric solids
Use or create geosolid
models
EM Game: 3-D Shape Sort,
EM Activity: polyhedral Dice,
EM Activity: Cube pattern,
EM Activity: rectangular
Prism Pattern,

EM Game: Robot
Activity: "Shape Cutter"
This is new vocabulary for
students: slide, flip and turn
are previous vocabulary used
Provide projects in which
student must use one shape
and show all three
transformations

Everyday Mathematics, Lesson 3.6, 3.8, 9.3
Illuminations website
Teaching Student-Centered Mathematics,
Grades 3-5, Lovin and Van de Walle
Teacher supplement
Middle School Mathematics with Pizzazz,
selected activities
Flemington-Raritan School District
Mathematics Curriculum

*Define and create tessellations

EM Activity: Tessellation Museum.

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

*Know properties of polygons

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

Use real applications

Provide models for student to explore

Provide students with models to explore and compare

Literature Link

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

Activity:* Lost in the Crowd*

Literature Link

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.

Use real applications

Provide models for student to explore

Provide students with models to explore and compare

Literature Link

Website resources

*Define and create tessellations

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, Lesson 3.7

Teacher supplement Illuminations website Geometry in the World of Art - Grades 3-5

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
D. Units of Measurement

1. Select and use appropriate units to measure angles and area.

   *Understand the concept of area of a figure

   Have whole class discussions about measures and the appropriate measuring units: both metric and US customary

   Everyday Mathematics Lesson 3.3, 3.4, 3.9, 9.4, 9.5, and 9.6
   Teacher supplement

   *Use the formula for area of a rectangle

   Provide multiple opportunities for student to explore area using manipulatives, models and graph paper in different unit sizes. Emphasize square units as the measuring unit

   Everyday Mathematics, Lesson 9.4, 9.5, 9.6

   Explore ideas of variables used in formulas; Explore patterns to help develop the formula; Explore areas of irregular shapes that could be partitioned into smaller rectangles.

   Everyday Mathematics, Lesson 9.4
   Middle School Mathematics with Pizzazz, Creative Publications, selected activities
<table>
<thead>
<tr>
<th>Topic</th>
<th>Activity</th>
<th>Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Explore strategies, including the rectangle method, for finding areas of polygons</em></td>
<td>Explore using geoboard, centimeter graph paper; Elicit strategies to find the areas, e.g., add parts, build up and subtract</td>
<td>Everyday Mathematics, Lesson 9.5 and 9.6 Spaghetti and Meatballs for All, Cheryl Rectanus</td>
</tr>
<tr>
<td><em>Use formulas for area of triangle and parallelogram</em></td>
<td>Explore using manipulatives and models heights (altitude) and bases of triangles and parallelograms, use geoboard activities and graph paper</td>
<td>Everyday Mathematics, Lesson 9.6 Middle School Mathematics with Pizzazz, Creative Publications, selected activities</td>
</tr>
<tr>
<td><em>Estimate distances using a map scale</em></td>
<td>Have class discussions about measuring on a map; Work in cooperative groups</td>
<td>Everyday Mathematics, Lesson 4.3 Teacher supplement Sketchpad: U.S. Cities</td>
</tr>
<tr>
<td><em>Reading a ruler (previous grade secure)</em></td>
<td>Provide multiple opportunities for students to measure and draw lengths using both centimeter and inch ruler.</td>
<td>Teacher supplement Website resources Transparency Rulers - Master Rulers</td>
</tr>
<tr>
<td><em>Select reasonable measurement units, US and metric</em></td>
<td>EM Activity: Finding Personal Measures for One’s Body Allow students to create own multiple choice problems using both US customary and metric units for length, weight and capacity</td>
<td>Everyday Mathematics, Lesson 6.2 Math Masters Sample multiple choice assessment like items from NJ state and other state assessments</td>
</tr>
<tr>
<td>2. Convert measurement units within a system (e.g., 3 feet = ___ inches).</td>
<td>Activity: &quot;Measuring Up&quot; EM Activity: Finding Measurement Equivalencies</td>
<td>Illuminations website Teacher supplement Middle School Mathematics with Pizzazz, selected activities Everyday Mathematics, Lesson 9.10</td>
</tr>
<tr>
<td>3. Know approximate equivalents between the standard and metric systems (e.g., one kilometer is approximately 6/10 of a mile).</td>
<td>Reference Page of Journal 2 (back cover)</td>
<td>Everyday Mathematics, Lesson 6.2, 11.6</td>
</tr>
</tbody>
</table>
**Flemington-Raritan School District**  
**Mathematics Curriculum**

<table>
<thead>
<tr>
<th><em>Examine the relationship among liter, milliliter, and cubic centimeter</em></th>
<th>Use models to demonstrate equivalencies</th>
<th>Everyday Mathematics, Lesson 9.10</th>
</tr>
</thead>
</table>

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

| **Project 8- Pendulums**  
Provide some informal indirect measurement examples | Everyday Mathematics, Lesson 2.5, 10.5 |
|---|---|

| *Understand the concept of capacity and how to calculate it* | Solve problems involving units of weight, see Teacher's guide for examples | Everyday Mathematics Lesson 11.6  
Teacher supplement with Open-ended problems from various sources |
|---|---|

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

| Provide students with opportunities to write and solve number stories involving elapsed time: include fractions, decimals and whole numbers, e.g., daily schedule, cooking, appointments, getting ready for school | EM teacher's guide  
Teacher supplement  
Website resources |
|---|---|

| **E. Measuring Geometric Objects**  
**1. Use a protractor to measure angles.** | Geometry template, Have students explore using both half and circle protractors  
EM Activity: Pattern Block Angles | Everyday Mathematics, Lesson 3.3 3.4  
Middle School Mathematics with Pizzazz, selected activities |
|---|---|

| *Estimate the measure of an angle*  
Cooperative group exploration activities | Everyday Mathematics, Lesson 3.6, 3.8  
Sketchpad: Angle Estimation.  
*Measure an angle within 2 degrees*  
Math Masters  
Sketchpad: Introducing Protractors. |---|
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

Teacher supplement

V P t a Q J i V l l l

*Polygons

Use models, polygon tiles or other to explore area

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

*Triangles

Everyday Mathematics, Lesson 9.6

Math Masters

Sketchpad: Rectangles and Triangles.

Everyday Mathematics, Lesson 9.6

*Parallelograms

Explore using manipulatives and models

Geoboards, graph paper

Everyday Mathematics, Lesson 9.4, 9.5, 9.6

Everyday Mathematics, Lesson 10.8 and 10.9

Teacher supplement

*Circles

Everyday Mathematics, Lesson 10.8 and 10.9

The Librarian Who Measured the Earth, Kathryn Lasky

Website resources for “pi”

*Identify the base and height of triangles and parallelograms

Everyday Mathematics, Lesson 9.4, 9.5, 9.6

Everyday Mathematics, Lesson 9.6

*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”
*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

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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, \( l = 4 \) units, \( w = 3 \) units, what is \( h? \)

Demonstration by teacher or students working in cooperative groups. Students may not be adept in experimentation accuracy for this to show accurate results. Have students make prediction and then find the difference between their prediction and the actual result.

Everyday Mathematics, Lesson 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

Website resources

Everyday Mathematics, Lesson 9.8, 9.9, 9.10
Sketchpad: Cube Nets, Stack it Up

Everyday Mathematics, Lesson 11.5
See science curriculum topics of displacement or calibration

Website resources
<table>
<thead>
<tr>
<th>Understand the concept of surface area of a figure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Find the surface area of prisms</td>
</tr>
<tr>
<td>Understand how to find the surface area of cylinders</td>
</tr>
</tbody>
</table>

### 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).

<table>
<thead>
<tr>
<th>Geosolid with folding nets Gather 3-D objects and discuss the faces and their coverings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explore surface area using nets and writing recipes for finding surface areas</td>
</tr>
<tr>
<td>Use everyday examples of cylinders</td>
</tr>
<tr>
<td>Explore rectangles using geoboard activities and other models</td>
</tr>
</tbody>
</table>

**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**
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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>
<thead>
<tr>
<th>Knowledge/Skills/Understandings</th>
<th>Assessments</th>
<th>Learning Experiences</th>
<th>Resources</th>
</tr>
</thead>
</table>
| A. Patterns                    | Teacher Observation/RSA (Recognizing Student Achievement) | EM Activity: Number Patterns using dots, Math Masters.  
*Patterns that Grow*  
Provide multiple opportunities for exploring patterns involving manipulatives, numbers, models and other objects | Everyday Mathematics Units 1, 2, 7, 10  
Teacher supplement  
Illuminations websites  
Sketchpad: The Envelope |
| 1. Recognize, describe, extend, and create patterns involving whole numbers. | Test/Quiz  
Exit Ticket  
EM Unit 10 checking progress | *Explore Fibonacci Sequence*  
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 | Everyday Mathematics, Lesson 10.4, 10.5, 10.7  
Website resources  
Navigations in Algebra, grades 3-5, NCTM, selected activities  
Teacher supplement  
Website and Library resources |

- Descriptions using tables, verbal rules, simple equations, and graphs

<table>
<thead>
<tr>
<th>B. Functions &amp; Relationships</th>
<th>Assessments</th>
<th>Learning Experiences</th>
<th>Resources</th>
</tr>
</thead>
</table>
| 1. Describe arithmetic operations as functions, including combining operations and reversing them. | Allow student to explore ways to evaluate expressions | *Translate word descriptions into algebraic expression*  
Discuss common symbols for words, e.g., twice, half | Everyday Mathematics Lesson 7.4, 7.5  
Groundworks for Algebra, Creative Publications  
Sketchpad: Function Machines.  
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

   - 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
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

   EM Unit 9, 10 checking progress and assessment.
   Use pan-balance, geoboard, manipulatives and other models to solve

   Everyday Mathematics, Lesson 9.6, 10.3, 10.4, 10.5, 10.7.
   Middle School Mathematics with Pizzazz, selected activities
   Teaching Student Centered Mathematics, Grade 3-5 & 5-8, Lovin & Van de Walle, selected activities

Use story problems to generate variable expressions
Provide multiple opportunities to explore rate relationships in various problem situations
Use manipulatives and models to explore solutions
Allow students to use manipulatives and other models to assist in solving stories
EM Activity: Predicting Old Faithful's Next Eruption
EM Project 8: Pendulum
Explore line graph data
Explore: temperature over a month time, growth of plants, height of growth from child to adult

Everyday Mathematics, Lesson 10.3 teacher supplement
Everyday Mathematics Lesson 10.4 Teacher supplement
Everyday Mathematics, Lesson 2.4, 10.2 Teacher supplement
Everyday Mathematics, Lesson 4.5, 4.6
Everyday Mathematics, Lesson 10.5, 10.7
Website resources
Teacher supplement
Website resources
2. Understand and use the concepts of equals, less than, and greater than in simple number sentences. (Grade 4 secure)
   *Symbols (<, >, =)

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

*Solve one-step pan-balance problems

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

EM Unit 7 checking progress

*Solve two-step pan-balance problems

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

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

Apply these properties when simplifying numerical expression including whole numbers, decimals, fractions and integers.
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>
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<th>Learning Experiences</th>
<th>Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Data Analysis</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| 1. Collect, use, generate, organize, and display data. | Teacher Observation/RSA (Recognizing Student Achievement) Unit 6 Checking Progress/Quiz Exit Ticket Evaluation of student completed projects using a rubric | EM Activity: Class Data for number of States students / adults have visited EM Activity: Collecting Exercise Data | Everyday Mathematics, Lesson 6.1, 12.7  
Best of Math I & II, Exemplars CD |
| • Data generated from surveys   |             |                     |           |
Everyday Mathematics, Lesson 3.1, 3.2, 6.1, 6.6  
Sketchpad: Target Mean Game. |

Teacher supplement with various graphs from newspapers, periodicals, encyclopedias, and other related documents
| **Flemington-Raritan School District**<br>**Mathematics Curriculum** | **• Bar graph, line graph, circle graph, table**<br>EM Unit 5 checking progress | **• range, median, and mean**<br>EM Unit 2 checking progress | **Teacher supplement**<br>Website resources<br>*Everyday Mathematics, Lesson 5.9, 5.10, 5.11, 6.1, 6.4, 6.6<br>Best of Math I and II, Exemplars**<br>*Use a Percent Circle to find percents of circle graphs<br>*Measures pieces of a circle graph; interpret a circle graph<br>*Construct circle graph<br>*Construct, read and interpret stem-and-leaf plots (B/D)**<br>Everyday Mathematics, Lesson 5.10, 5.11<br>EM Math Masters<br>*Identify the statistical landmarks for maximum, minimum, median, and mode**<br>Everyday Mathematics, Lesson 5.11<br>Math Masters<br>Everyday Mathematics, Lesson 6.3, 6.4<br>Teacher supplement<br>Best of Math I & II, Exemplars CD<br>Sketchpad: Target Mean Game<br>Illuminations website and others<br>*Provide multiple opportunities to explore these measures and their value in different contexts<br>Discuss meaning for average and different uses of<br>**EM Activity: The Great Span**<br>**EM Activity: Estimate Reaction Time**<br>**EM Activity: States visited by Adults and Students**<br>**Everyday Mathematics, Lessons 2.5, 6.1, 6.4, 6.5, 6.6** |

Discuss differences of each type of graph and why one over another is appropriate for different types of data<br>EM activity: Interpreting Data<br>EM Activity: Create circle graphs with Class Snack Survey<br>EM Activity: Acting out the Construction of a Circle graph<br>Find and use circle graphs<br>Use protractor to measure sectors<br>Use various sample data sets to create stem and leaf plots<br>EM Journal activity; Measuring the Great Span<br>EM Math Masters<br>EM Activity: Reaching and Jumping<br>Provide multiple opportunities to explore these measures and their value in different contexts<br>Discuss meaning for average and different uses of
Flemington-Raritan School District
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* Collect, organize, use and display data landmarks
  Give students central tendency data and have them create data sets: e.g., Sample data set, mean is 10, median is 15, mode is 8, find the set of 5 numbers that satisfy these conditions. Use open-ended problems EM Math Masters EM Activity: Constructing a Graph from Landmarks. Everyday Mathematics, Lesson 2.5, 6.5 Website resources Best of Math I and II, Exemplars CD

* Interpret mystery line plots and graphs
  Explore examples of story telling graphically and then model. Everyday Mathematics, Lesson 6.4, 10.7, 12.7 Teacher supplement

* Understand how sample size affects results
  EM Activity: Sample Candy Color Provide multiple experiences changing sample size using models and manipulatives e.g., number of test questions Everyday Mathematics, Lesson 6.5 Website resources

3. Respond to questions about data and generate their own questions and hypotheses. Everyday Mathematics - Unit 6 Teacher supplement
B. Probability

1. Determine probabilities of events.

- 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).
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

- Given data obtained experimentally, what is the likely distribution of items in the bag

  Perform probability simulations and give results of experiment

- 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

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"

- Organized lists, charts, tree diagrams, tables

  EM Activity: Venn Diagrams

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

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

  Website resources
  Best of Math I and II, Exemplars CD
  Sketchpad: Hide the Spinner

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

  Jumanji, Chris Van Allsburg
  Teacher supplement

  Everyday Mathematics, Lesson 2.6, 12.2

  Website resources
  Best of Math I and II, Exemplars CD
  Sketchpad: Hide the Spinner

  Everyday Mathematics, Lesson 2.6, 6.5, and 12.5
  Navigation in Data and Analysis in Grades 3-5, NCTM, selected activities

  Everyday Mathematics, Lesson 12.2
  Teacher supplement

  Everyday Mathematics, Lesson 12.2
  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 $3 \times 4 = 12$ outfits using 3 shirts and 4 skirts).

* Use the Multiplication Counting Principle to find the total number of possible outcomes of a sequence of choices.

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)

Fourth Grade Extension Activity: "Four-by-Four Block" Everyday Mathematics, Lesson 12.2
Everyday Mathematics, Lesson 12.2
Explain It! Selected problems
Website resources
Sketchpad: How Many Ways

EM Activity: Probability Investigations Everyday Mathematics, Lesson 12.2
Middle School Mathematics with Pizzazz, Creative Publications

EM Game: Finish First Everyday Mathematics, Lesson 6.2
Everyday Mathematics, Lesson 12.2
Teacher supplement

Design games to play and find strategies for winning: dice

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

Teacher supplement

Use manipulatives and other models

Teacher supplement

Use museum, zoo, or school floor plans

Teacher supplement

NCTM website

Question Quest Level A

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>Learning Experiences</th>
<th>Resources</th>
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<tbody>
<tr>
<td>A. Problem Solving</td>
<td>Teacher Observation/RSA (Recognizing Student Achievement) Test/Quiz Exit Ticket</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>
</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.

1. Learn mathematics through problem solving, inquiry, and discovery.

2. Solve problems that arise in mathematics and in other contexts (cf. workplace readiness standard 8.3).

• Open-ended problems

Evaluate student solution using a rubric

Provide students with opportunities to score other students solutions using a rubric

Sample open-ended questions from NJ and other states

Best of Math I and II Exemplars CD
<table>
<thead>
<tr>
<th>Non-routine problems</th>
<th>Exemplars</th>
<th>EM teacher’s Guide</th>
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<td></td>
<td></td>
<td><em>Best of Math I and II, Exemplars CD</em></td>
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<tr>
<td></td>
<td></td>
<td>Open-ended responses</td>
</tr>
<tr>
<td>Problems with multiple solutions</td>
<td>Provide opportunities for student to answer questions using the Geometer’s Template.</td>
<td><em>Explain It</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>Everyday Mathematics, Lesson 3.10</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sample Open-ended questions from NJ and other states</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Website resources for open-ended problems</td>
</tr>
<tr>
<td>Problems that can be solved in several ways</td>
<td>Discuss solution strategies for various open-ended problems</td>
<td>Teacher supplement</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>Best of Math I and II, Exemplars CD</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Open-ended responses</td>
</tr>
</tbody>
</table>

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 |

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 |

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

B. Communication

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

- Reading and writing
- Discussion, listening, and questioning

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

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

Teacher supplement

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

- Best of Math I and II, Exemplars CD

Teacher supplement

- Teacher Observation
- Group presentations of winning strategies for games

EM Game: First to 21
4. Use the language of mathematics to express mathematical ideas precisely.

Ask student to create a poem about order of operations, area, perimeter and volume

Best of Math I and II, Exemplars CD
Teacher supplement

C. Connections

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

Everyday Mathematics Lesson 3.8

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

Math Masters

Best of Math I and II, Exemplars CD

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

Everyday Mathematics
American Tour Lessons

Everyday Mathematics: American Tour in Student Reference book
4. Apply mathematics in practical situations and in other disciplines.

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

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

1. Recognize that mathematical facts, procedures, and claims must be justified.
   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.** | EM Activity: Graphing race results - make prediction who will complete the course first | *Best of Math I and II, Exemplars CD*  
*Everyday Mathematics, Lesson 10.6* |
| --- | --- | --- |
| **• Counterexamples as a means of disproving conjectures** | Provide opportunities for examples and non-examples, e.g., polygon / not polygon | *Teacher supplement*  
*Exemplars I and II*  
*NJ State rubric* |
| **• Verifying conjectures using informal reasoning or proofs.** | 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* |
| **6. Evaluate examples of mathematical reasoning and determine whether they are valid.** | Provide opportunities to score solutions of their students and provide appropriate feedback | *Teacher supplement*  
*Exemplars I and II*  
*Best of Math I and II, Exemplars CD*  
*NJ State mathematics rubric* |
| **E. Representations** | Explore strategies for solving open-ended problems | *Best of Math I and II, Exemplars CD*  
*Concrete representations (e.g., base-ten blocks or algebra tiles)*  
*Pictorial representations (e.g., graphs, charts)*  
*Teacher supplement*  
*Everyday Mathematics, Unit 10* |
### Flemington-Raritan School District
#### Mathematics Curriculum

<table>
<thead>
<tr>
<th>• Symbolic representations (e.g., a formula)</th>
<th>variables, equations</th>
<th><em>Everyday Mathematics</em>, Unit 10</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>• Graphical representations (e.g., a line graph)</th>
<th>EM Journal</th>
<th><em>Everyday Mathematics</em>, Unit 10 Teacher supplement</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>2. Select, apply, and translate among mathematical representations to solve problems.</th>
<th>EM Lesson 2.4, Mental Math and Reflexes</th>
<th><em>Best of Math I and II, Exemplars CD</em></th>
</tr>
</thead>
</table>

|-----------------------------------------------------------------------------------------------|-------------------------------------------------|--------------------------------------------------|

### F. Technology

<table>
<thead>
<tr>
<th>1. Use technology to gather, analyze, and communicate mathematical information.</th>
<th>Students display of findings; ex. posters, charts, PowerPoint</th>
<th>Place Value Puzzles Website resources Math Boxes</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>2. Use computer spreadsheets, software, and graphing utilities to organize and display quantitative information (cf. workplace readiness standard 8.4-D).</th>
<th>Use Microsoft Excel</th>
<th><em>Everyday Mathematics</em>: Lesson Units 5 and 6 Teacher supplement</th>
</tr>
</thead>
</table>
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).
<table>
<thead>
<tr>
<th>Unit</th>
<th>Number of Days (approximate)</th>
<th>Unit</th>
<th>Number of Days (approximate)</th>
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<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>
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<tr>
<td><strong>Unit 2</strong> Operations with Whole Numbers and Decimals</td>
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<td><strong>Unit 5</strong> 2 Dimensional Geometry</td>
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<tr>
<td>Metric and Customary Measurement</td>
<td>8</td>
<td><strong>Unit 6</strong> - Number Systems and Algebra Concepts</td>
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<tr>
<td><strong>Unit 3</strong> Variables, Formulas and Graphs</td>
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<td><strong>Unit 7</strong> - Probability</td>
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<tr>
<td>Prime Time- Factors, Multiples, and Prime Numbers</td>
<td>10</td>
<td><strong>Unit 9</strong> - Variables, Formulas and Graphs</td>
<td>10</td>
</tr>
<tr>
<td><strong>Unit 4</strong> Rational Number Uses and Operations</td>
<td>20</td>
<td><strong>End-of-the-Year Assessment</strong></td>
<td>1</td>
</tr>
<tr>
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<td><strong>Mid-Year Assessment</strong></td>
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<td><strong>End-of-the-Year Assessment</strong></td>
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</tbody>
</table>
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>
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<tbody>
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<td>A. Number Sense</td>
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</table>

1. Use real-life experiences, physical materials, and technology to construct meanings for numbers: All Integers; All fractions as part of a whole, as subset of a set, as a location on a number line, and as divisions of whole numbers; All Decimals; percents; whole numbers with exponents  
   - Unit Assessments  
   - Do Now  
   - Teacher Observation  
   - Class Discussion  
   - Slate Assessments  
   - Open Ended Writing Tasks  
   - RSA Sections of EM3  
   - Direct Instruction  
   - Cooperative – Collaborative Learning Experiences  
   - Written Explanations  
   - Open Ended Writing Tasks  
   - Games  
   - Geometer’s Sketch Pad – Lesson Links  
   - *Everyday Mathematics, Book 6- Units 2, 4, 6*  
   - Selected Brain Pop applications  
   - [www.brainpop.com](http://www.brainpop.com)  
   - Geometer’s Sketch Pad  
   - New Jersey Math Frameworks 13  
   - [http://dimacs.rutgers.edu/njmathcoalition/framework.html](http://dimacs.rutgers.edu/njmathcoalition/framework.html)  
   - *Van De Walle* Chapters 9-14

2. Recognize the decimal nature of United States currency and compute with money.  
   - *Everyday Mathematics, Book 6- Unit 2*

3. Demonstrate a sense of the relative magnitudes of numbers.  
   - *Power of Ten-video*  
   - *Everyday Mathematics, Book 6- Unit 2*

4. Explore the use of ratios and proportions in a variety of situations.  
   - *Everyday Mathematics, Book 6- Unit 8*  
   - *Van De Walle* Chapter 18

5. Understand and use whole-number percents between 1 and 100 in a variety of situations.  
   - *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.

7. Develop and apply number theory concepts in problem solving situations: Primes, Factors, Multiples; common multiples, common factors

8. Compare and order numbers of all types.

9. Understand that all fractions can be represented as repeating or terminating decimals.

10. Understand and use ratios, proportions, and percents in a variety of situations.

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: paper and pencil, mental math, calculator

Everyday Mathematics, Book 6- Unit 4
Van De Walle Chapters 15, 16
New Jersey Math Frameworks
http://dimacs.rutgers.edu/njmathcoalition/framework.html

Connected Math- Prime Time

Everyday Mathematics, Book 6 Units 2, 4

Everyday Mathematics, Book 6 Units 2, 4

Everyday Mathematics, Book 6- Unit 8
Van De Walle Chapter 18

Everyday Mathematics, Book 6

Everyday Mathematics, Book 6
Everyday Mathematics, 5 Minute Math
Van De Walle Chapters 15, 16
Flemington-Raritan School District
Mathematics Curriculum

3. Use an efficient and accurate pencil-and-paper procedure for division of a 3-digit number by a 2-digit number.

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

Everyday Mathematics, Book 6- Unit 2

Everyday Mathematics, Book 6

Everyday Mathematics, Book 6

Units- 2, 3
Van De Walle Chapters 24
New Jersey Math Frameworks
http://dimacs.rutgers.edu/njmathcoalition/framework.html

Everyday Mathematics, Book 6

Units- 3, 6
New Jersey Math Frameworks 3
http://dimacs.rutgers.edu/njmathcoalition/framework.html

Everyday Mathematics, Book 6 Units- 3, 6

Everyday Mathematics, Book 6- Unit 2
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.

*Everyday Mathematics, Book 6*
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?

<table>
<thead>
<tr>
<th>Knowledge/Skills/Understandings</th>
<th>Assessments</th>
<th>Learning Experiences</th>
<th>Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Geometric Properties</td>
<td>Unit Assessments</td>
<td>Direct Instruction</td>
<td>Everyday Mathematics, Book 6- Units 5, 10</td>
</tr>
<tr>
<td></td>
<td>Do Now</td>
<td>Cooperative –</td>
<td>Van De Walle Chapter 20</td>
</tr>
<tr>
<td></td>
<td>Teacher Observation</td>
<td>Collaborative Learning Experiences</td>
<td>Groundworks Series – Geometry</td>
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<tr>
<td></td>
<td>Class Discussion</td>
<td></td>
<td>Groundworks Series – Measurement</td>
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<tr>
<td></td>
<td>Slate Assessments</td>
<td>Written Explanations</td>
<td>New Jersey Math Frameworks, 7</td>
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<tr>
<td></td>
<td>Open Ended Writing Tasks</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>RSA Sections of EM3</td>
<td>Games</td>
<td>NCTM Navigation Through Geometry 6-8</td>
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<td>Geometer’s Sketch Pad</td>
<td>Geometer’s Sketch Pad</td>
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<td></td>
<td></td>
<td>-Lesson Links</td>
<td></td>
</tr>
</tbody>
</table>

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

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

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?

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<thead>
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<tbody>
<tr>
<td>A. Patterns</td>
<td></td>
<td></td>
<td></td>
</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</td>
</tr>
<tr>
<td></td>
<td>Do Now</td>
<td>Cooperative – Collaborative</td>
<td>Van De Walle Chapters 22-25</td>
</tr>
<tr>
<td></td>
<td>Teacher Observation</td>
<td>Learning Experiences</td>
<td>Everyday Mathematics, Book 6 ± Units, 3, 6, 9</td>
</tr>
<tr>
<td></td>
<td>Class Discussion</td>
<td>Written Explanations</td>
<td>±-R'=-Al=-isEBN!-ABKEPad Lesson Links</td>
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<td></td>
<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>
<td></td>
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<tr>
<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>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Describe the general behavior of functions given by formulas or verbal rules</td>
<td></td>
<td></td>
<td>Van De Walle Chapter 23</td>
</tr>
<tr>
<td>C. Modeling</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>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.</td>
<td></td>
<td></td>
<td>Van De Walle Chapter 23</td>
</tr>
</tbody>
</table>
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 (\(\leq\), \(<\))
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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</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; 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><em>Everyday Mathematics, Book 6</em>- Unit 1 Navigations through Data Analysis TinkerPlots 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>
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<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>
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</tr>
</tbody>
</table>

*Everyday Mathematics, Book 6*- Unit 1 Navigations through Data Analysis TinkerPlots New Jersey Math Frameworks, 5, 12, 14 [http://dimacs.rutgers.edu/njmathcoalition/framework.html](http://dimacs.rutgers.edu/njmathcoalition/framework.html)
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 $3 \times 4 = 12$ outfits using 3 shirts and 4 skirts); Number of ways a specified number of items can be arranged in order (concept of permutation); Number of ways of selecting a slate of officers from a class

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](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).

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
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.
Flemington-Raritan School District
Mathematics Curriculum

6th Grade Algebra 1A
Pacing Guide

<table>
<thead>
<tr>
<th>Unit</th>
<th>Approximate Number of Class Days</th>
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<tbody>
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<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>
<thead>
<tr>
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<th>Learning Experiences</th>
<th>Resources</th>
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<tbody>
<tr>
<td><strong>A. Number Sense</strong></td>
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</tr>
<tr>
<td>1. Extend understanding of the number system by constructing meanings for the following (unless otherwise noted, all indicators for grade 8 pertain to these sets of numbers as well): Rational numbers; Percents; Exponents; Roots; Absolute Values; Numbers represented in scientific notation</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>Discovering Algebra Chapters 2, 4 UCSMP Transitions</td>
</tr>
<tr>
<td>2. Demonstrate a sense of the relative magnitudes of numbers.</td>
<td>Number line graphing Lesson Investigations throughout the textbook</td>
<td></td>
<td>Discovering Algebra Chapters 1,2</td>
</tr>
<tr>
<td>3. Understand and use ratios, proportions, and percents (including percents greater than 100 and less than 1) in a variety of situations.</td>
<td>Lesson Investigations 2.2, 2.3, 3.1, 3.2, 3.3</td>
<td>( \text{Discovering Algebra Chapters 2,3} )</td>
<td></td>
</tr>
<tr>
<td>4. Compare and order numbers of all named types.</td>
<td>Lesson Investigation 2.2</td>
<td>( \text{Discovering Algebra Chapters 1,2} )</td>
<td></td>
</tr>
<tr>
<td>5. Use whole numbers, fractions, decimals, and percents to represent equivalent forms of the same number.</td>
<td>Lesson Investigation 2.1</td>
<td>( \text{Discovering Algebra Chapter 2} )</td>
<td></td>
</tr>
</tbody>
</table>
6. Recognize that repeating decimals correspond to fractions and determine their fractional equivalents.

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.

3. Find square and cube roots of numbers and understand the inverse nature of powers and roots.

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.

5. Understand and apply the standard algebraic order of operations, including appropriate use of parentheses.

C. Estimation

1. Use equivalent representations of numbers such as fractions, decimals, and percents to facilitate estimation.

2. Recognize the limitations of estimation and assess the amount of error resulting from estimation.

Lesson Investigations 4.1, 4.2 Math with Pizzazz
Pre Algebra with Pizzazz
Algebra with Pizzazz
Discovering Algebra Chapter 4

Lesson Investigations 2.2, 2.3 Discovering Algebra Chapters 2, 3

Ongoing throughout chapter investigations

NJ ASK Coach
Flemington-Raritan School District
Mathematics Curriculum

**Grade: 6th Algebra 1A  Topic 4.2 Geometry and Measurement**

**Essential Questions:**
- How can knowledge of geometric properties help in problem solving situations?
- How can coordinate grid systems help in understanding locations?
- How does the mathematics of geometry enable us to wonder and understand our natural and physical world?

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<tbody>
<tr>
<td><strong>A. Geometric Properties</strong></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>1. Understand and apply properties of polygons: Quadrilateral, including squares, rectangles, parallelograms, trapezoids, rhombi; regular polygons</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</td>
<td>Geometer's Sketchpad Geometer's Sketchpad Lesson Links</td>
</tr>
<tr>
<td>2. Understand and apply the concept of similarity: Using proportions to find missing measures; scale drawings; models of 3D objects</td>
<td>Lesson Investigation 3.3 Measure shadow of flagpole to determine height.</td>
<td></td>
<td>Discovering Algebra Chapter 3</td>
</tr>
<tr>
<td>3. Use logic and reasoning to make and support conjectures about geometric objects.</td>
<td>Lesson Investigation 3.3</td>
<td></td>
<td>Discovering Algebra Chapter 3</td>
</tr>
<tr>
<td><strong>B. Transforming Shapes</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>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</td>
<td>Manipulatives</td>
<td></td>
<td>Geometer's Sketchpad Geometer's Sketchpad Lesson Links</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td><strong>NJ ASK Coach</strong></td>
</tr>
</tbody>
</table>
(stretching/shrinking) result in images similar
to pre-image.

C. Coordinate Geometry
1. Use coordinate in four quadrants to represent geometric concepts
   ● Slope of a line segment
   Lesson Investigations 1.6, 4.4, 4.6, 4.7, 5.1, 5.2
   Graphing Calculator Applications
   Discovering Algebra Chapter 1,4+5
   Algebra with Pizzazz
   Pre-Algebra with Pizzazz
   NJ ASK Coach
   Geometer's Sketchpad Lesson Links
   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.
   Lesson Investigations 2.3 , 3,2 Discovering Algebra Chapters 2

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

4. Recognize that all measurements of continuous quantities are approximations.
   Appropriate use throughout Lesson. Investigations
   Ongoing
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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| **A. Patterns**                | Unit Assessments  
  Do Now  
  Teacher Observation  
  Discussion  
  Investigation Results  
  Open Ended Writing  
  Tasks | Direct Instruction  
  Lesson Investigation 4.3, 4.4, 4.6  
  Modeling  
  Graphing Calculators | *Discovering Algebra* Chapter 4 |
| **B. Functions and Relationships** | Lesson Investigations 4.4, 4.6, 4.7, 5.1, 5.2, 5.3 | *Discovering Algebra* Chapters 4 and 5 |
| **C. Modeling**                | Lesson Investigations 3.2, 4.3, 4.4, 4.6, 4.7, 5.1, 5.2, 5.3 | *Discovering Algebra* Chapters 3, 4, 5 |
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
5. Understand and apply the properties of operations, numbers, equations, and inequalities: Additive inverse; Multiplicative inverse; addition and multiplication properties of equality

Discovering Algebra
Chapters 2, 3, 4
Pre-Algebra with Pizzazz
## 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

#### A. Data Analysis

1. Select and use appropriate representations for sets of data, and measures of central tendency (mean, median, and mode): Type of display most appropriate for given data; Box-and-whisker plot, upper quartile, lower quartile; Scatter plot; Calculators and computer used to record and process information; Finding the median and mean (weighted average) using frequency data; Effect of additional data measures of central tendency

2. Make inferences and formulate and evaluate arguments based on displays and analysis of data.

3. Estimate lines of best fit and use them to interpolate within the range of data

#### B. Probability

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

### Assessments

<table>
<thead>
<tr>
<th>Knowledge/Skills/Understandings</th>
<th>Assessments</th>
<th>Learning Experiences</th>
<th>Resources</th>
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<tbody>
<tr>
<td>A. Data Analysis</td>
<td></td>
<td></td>
<td><strong>Discovering Algebra</strong> Chapter 1</td>
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<tr>
<td></td>
<td>Unit Assessments</td>
<td>Direct Instruction</td>
<td>TinkerPlots</td>
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<tr>
<td></td>
<td>Do Now</td>
<td>Collaborative and Cooperative</td>
<td></td>
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<tr>
<td></td>
<td>Teacher Observation</td>
<td>Learning</td>
<td></td>
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<td></td>
<td>Discussion</td>
<td>Open Ended Writing Tasks</td>
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<tr>
<td></td>
<td>Investigation Results</td>
<td>Tinkerplots Software</td>
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<td></td>
<td>Open Ended Writing Tasks</td>
<td>Geometer’s Sketchpad Software</td>
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<tr>
<td></td>
<td></td>
<td>Lesson Investigations 1.1 to 1.7</td>
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<tr>
<td></td>
<td></td>
<td>Investigate decimal patterns using calculator</td>
<td></td>
</tr>
</tbody>
</table>

### Learning Experiences

- Direct Instruction
- Collaborative and Cooperative Learning
- Open Ended Writing Tasks
- Tinkerplots Software
- Geometer’s Sketchpad Software
- Lesson Investigations 1.1 to 1.7
- Investigate decimal patterns using calculator

### Resources

- **Discovering Algebra** Chapter 1
- TinkerPlots
- Lesson Investigations 1.1-1.7
- **Discovering Algebra** Chapter 5
- Lesson Investigation 5.3
- **Discovering Algebra** Chapter 2
- Connected Mathematics “What Do You Expect”
- Math With Pizzazz Book E
- Pre Algebra with Pizzazz
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 from one site to another: Finding the shortest circuit on a map that makes a tour of specified sites.

What Do You Expect?
New Jersey Math Frameworks 12
http://dimacs.rutgers.edu/njmathcoalition/framework.html
Groundworks Series Data and Probability
NJ Ask Coach
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/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.

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
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
# 3rd Grade Gifted and Talented 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. 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>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?

<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></td>
<td></td>
<td></td>
</tr>
<tr>
<td>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).</td>
<td>Teacher observation</td>
<td>Games: Chip Trading, High Number Toss, Top It (<em>Everyday Mathematics</em>)</td>
<td>Sheet # 37</td>
</tr>
<tr>
<td></td>
<td>Teacher play with student</td>
<td>Digit Place or Pico, Fermi, Bagels</td>
<td><em>Family Math</em>, Lawrence Hall of Science, Berkeley, CA, 1986</td>
</tr>
<tr>
<td></td>
<td>Do Now: SL.2.3</td>
<td>Metric Model Class Project 1-Million (picture) SP 134 &amp; 135 <em>Everyday Mathematics</em> Unit 7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Unit 7 W-Up Quiz and <em>Everyday Mathematics</em> assessment 7.13</td>
<td>MB Fraction Kit, Circle Fractions Fraction Factory</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Decimal Quiz Sheet # 2</td>
<td>Do Now Sheet #28</td>
<td><em>Everyday Mathematics</em> 2.3 &amp; 2.4</td>
</tr>
<tr>
<td></td>
<td>Decimal Factory, Decimal Model (picture) SL. 4.1</td>
<td>Decimal Do Now Sheet #27</td>
<td><em>Everyday Mathematics</em> 4.3, SRB p. 24 Game: Smaller to Larger SL 4.9</td>
</tr>
</tbody>
</table>
Flemington-Raritan School District
Mathematics Curriculum

4. Understand the various uses of numbers.

<table>
<thead>
<tr>
<th>Math congress</th>
<th>SRB p. 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>More About Dates</td>
<td><a href="http://www.mathsolutions.com">www.mathsolutions.com</a></td>
</tr>
<tr>
<td>Past Issues: Fall/Winter 2000-2001</td>
<td></td>
</tr>
</tbody>
</table>

- 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.

<table>
<thead>
<tr>
<th>Anecdotal notes with observation rubric</th>
<th>Pattern blocks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Geoboards</td>
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<tr>
<td></td>
<td>Tangram</td>
</tr>
<tr>
<td></td>
<td>Cuisenaire Rods</td>
</tr>
<tr>
<td>Game: Number Paths, Sheet # 8 Calling All Students</td>
<td><a href="http://www.exemplars.com/materials/samples">www.exemplars.com/materials/samples</a></td>
</tr>
</tbody>
</table>

Quiz: JP 29

6. Compare and order numbers.

<table>
<thead>
<tr>
<th>Performance task: students create page for ___ ways to get to 15</th>
<th>Literature Link (manual p. 86)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Twelfth Ways to Get to 11, Eve Merriam, Aladdin Paperback, 1995</td>
<td>Everyday Mathematics 2.3</td>
</tr>
</tbody>
</table>

7. Explore settings that give rise to negative numbers.

<table>
<thead>
<tr>
<th>3rd grade addition/subtraction problems sheet #10</th>
<th>Above/below Sea level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Create a number sentence sheet #13</td>
<td>4 Quadrant Coordinate Grid</td>
</tr>
</tbody>
</table>

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

B. Numerical Operations
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

Math Homework that Counts, A. Raphel
Math Solutions 2000

SL. 3.7
Teacher observation

I Have... Who Has Cards
Multiplication Tic Tac Toe
How Long How Many
Circles and Stars

Everyday Mathematics (4-b), Rusty Bresser, Math Solutions, 1995

Literature. Link:
Things That Come in Groups
Class Project

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

What in the World, M. Burns, Cuisenaire, 1991

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

Teacher observation

I Have... Who Has Cards
Multiplication Tic Tac Toe
How Long How Many
Circles and Stars

Literature. Link:
Each Orange Had 8 Slices
Amanda Bean's Amazing Dream

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


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

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

www.mathsolutions.com Past Issues:
Spring/Summer 99
Lessons for Extending
Multiplication Grades 4-5,
Wickett & Burns, Math Solutions, 2001

MB lesson from VIDEO using Base 10 Blocks

Mathematics: Teaching for Understanding Video in Robert Hunter Library
Performance task: Write riddle.
Exchange with partner and solve

Everyday Mathematics 6.11
Unit 6 Warm-up Quiz
Journal paragraph

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

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
   Everyday Mathematics 4.5
   Literature Link: The Lunch Line
   www.mathsolutions.com
   Past Issues Fall/Winter 2000/01
   Making Change for 20¢
7. Select pencil-and-paper, mental math, or a calculator as the appropriate computational method in a given situation depending on the context and numbers.

---

Portfolio Prompts
Individual interview

Write number stories, exchange and solve
Write and solve place value puzzles
Describe a problem solving strategy

Everyday Mathematics 9.10
Unit 9 Warm-up Quiz Slates

Everyday Mathematics Unit 9
Percents
Percents, Proportions, and Grids

Van De Walle p. 288-289

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

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

Fraction Factory Pattern Blocks

Cuisenaire Rods
Creative Publications
1987
OUT OF PRINT

Fraction Factory Puzzles
Creative Publications
1987
OUT OF PRINT

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

Everyday Mathematics 6.3
Chip Trading Sheet # 37

---

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

Individual interview

Writing in Math Class, M. Burns, 1995

The Marilyn Burns Fraction Kit
Gr 4-6
Math Solutions Publications
2003

The Marilyn Burns Fraction Kit
Gr 4-6
Math Solutions
Publications
2003

JP 123 SL 5.4

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
Foot Figuring: Introducing the Metric System sheet # 26

Journal Prompt: If I were 1 cm tall....
Literature Link: How Big is a Foot?

Everyday Mathematics 5.12
Unit 5 Warm-up Quiz

Lessons for Extending Multiplication, Wickett & Burns, Math Solutions, 2001
About Teaching Mathematics, Marilyn Burns, Math Solutions, 2000

Author: Rolf Myller, Dell Yerling, 1990
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>
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<th>Learning Experiences</th>
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<tbody>
<tr>
<td><strong>A. Geometric Properties</strong></td>
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</tr>
<tr>
<td>1. Identify and describe spatial relationships of two or more objects in space.</td>
<td>Hand out packet</td>
<td><em>Everyday Mathematics</em> Project 6: Building &amp; Viewing Structures</td>
<td><em>Spatial Problem Solving with Cuisenaire Rods</em>, Davidson &amp; Willett, ETA/Cuisenaire, 2002</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Polygon Tiles</td>
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<td></td>
<td>Geoboard shape sorting: Polygons are...</td>
<td><em>Super Source</em> CD Rom video clip # 20</td>
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<td>Observation of vocabulary</td>
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<tr>
<td>2. Use properties of standard three-dimensional and two-dimensional shapes to identify, classify, and describe them.</td>
<td></td>
<td><em>Everyday Mathematics</em> Assessment 11 .8 Unit 22 Warm-up Quiz Time to Reflect</td>
<td><em>The Greedy Triangle</em>, Marilyn Burns, Math Solutions 1994</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Geometric solids and their parts</td>
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<td></td>
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<td>12 Wooden shapes -- Nets -- Pentominos</td>
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<td></td>
<td>Literature Link: <em>The Greedy Triangle</em></td>
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<td></td>
<td>Polydron Tiles -- students construct 3D solids</td>
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<td></td>
<td></td>
<td>Polygon Tiles -- students identify 2D shapes</td>
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<td>Roping in Quadrilaterals with Applet: Mystery Rings</td>
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<td></td>
<td>Everyday Mathematics Polygon Riddles</td>
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<td></td>
<td>Geometry riddles sheet # 11</td>
<td></td>
</tr>
</tbody>
</table>
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

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

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

---

**Everyday Mathematics 6.6 - 6.10**
- Applets: Mirror Tool: reflections, slides, flips, turns
- Applets: Cutting Corners Tool
- Applets: Two Geoboards

**Everyday Mathematics Unit 11**

---

**Everyday Mathematics**
- Assessment 10.7
- Unit 10 Warm-up Quiz
- Geoboard Shapes Sheet # 20
- Time to Reflect

---

**Everyday Mathematics Unit 1**
- Assessment 1.9
- Unit 1 Warm-up Quiz
- Time to Reflect
- Tangrams sheet # 9
- Construct angles with Geostrips

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

---

**NCTM Addenda Series Grades 5-8, 1992**

- Literature Link: Grandfather Tang's Story
- Tangram Challenges
- Navigations: Geometry 3-5, Applet

---

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

---

**Observation with checklist**

---

**Students build patterns with Pattern Blocks**

---

**Students informally create tessellations with Pattern Blocks**
Flemington-Raritan School District
Mathematics Curriculum

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).

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.
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 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
Grade: 3 - Gifted and Talented       Topic 4.3 Patterns and Algebra

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

<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>
<tr>
<td>1. Recognize, describe, extend, and create patterns.</td>
<td>Math Master p. 163</td>
<td>Frieze Patterns <em>Everyday Mathematics 10.5</em> SRB p.94</td>
<td><a href="http://www.borenson.com">www.borenson.com</a></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Students complete worksheets and present a solution at overhead. Math Congress: pairs of students present poster to classmates</td>
<td>Hands On Algebra book I  I Spy Patterns Algebra Scales</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Navigations through Algebra 3-5 Navigations through Algebra 3-5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The Variable Machine Hundred Board Wonders</td>
<td>NCTM.org Illuminations - lesson</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Function Machine &amp; Pan Balance Applets</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Patterns that grow: Patterns on charts with online calculator</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Number Patterns</td>
<td>Van de Walle p. 425</td>
</tr>
<tr>
<td></td>
<td></td>
<td>It All Adds Up!</td>
<td><a href="http://www.mathsolutions.com">www.mathsolutions.com</a> Past issues Fall/winter 2000/01</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>B. Functions and Relationships</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Use concrete and pictorial models to explore the basic concept of a function.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Flemington-Raritan School District  
Mathematics Curriculum

- Input/output table, T-charts  
  Everyday Mathematics What's my rule? JP 59 & 64 (Mbox)

- Combining two function machines  
  Rate Tables 12.2

- Reversing a function machine  
  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.  
   Everyday Mathematics 2.8 9.6

   NFC  
   Class graph

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

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 manual p. 191

   Number Balance  
   Van De Walle, p. 428

   Everyday Mathematics 3.10

   Different uses of variables

   Variables as unknowns

   Class discussion: Solve b + b + b - 20 = 16

   Number sentences involving relational thinking, p.31

### D. Procedures

1. **Understand and use the concepts of equals, less than, and greater than in simple number sentences.**
   
   Students share posters in Math Congress
   
   Equality, relational thinking
   
   *Symbols (\(=, <, >\))
   
   Journal paragraph: What I know now about \(=, <,\) and \(>\)
   
   True, false, and open number sentences
   
   
   *Everyday Mathematics 3.8
   
   *www.mathsolutions.com* Past Issues Fall 2002

2. **Understand, name, and apply the properties of operations and numbers.**
   
   NFC: Big Ideas
   
   Meanings for Operations
   
   *NFC: Big Ideas*
   
   Class Discussion: 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
   
   
   *Van De Walle p. 106

- Commutative (e.g., \(3 \times 7 = 7 \times 3\))
- Identity element for multiplication is 1 (e.g., \(1 \times 8 = 8\))
- Division by zero is undefined
- Any number multiplied by zero is zero
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>
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<th>Learning Experiences</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>SL 2.6</td>
<td><em>Everyday Mathematics</em> 2.5, 2.6, &amp; 2.8</td>
<td><em>NCTM Navigations through Data Analysis and Probability</em>, 3-5, 2002</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Enrichment: Bulletin Board</td>
<td>N. I. L. - Illuminations - Lesson: First Name, Last Name</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Display Above number line - Adults head circumference Below number line - 3rd grade head circumference</td>
<td><em>Van De Walle</em> p. 386</td>
</tr>
<tr>
<td>• Data generated from the school environment</td>
<td></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>Notes from Class</td>
<td>BIG Ideas</td>
<td><em>Van De Walle</em> p. 386</td>
</tr>
<tr>
<td>• Pictograph, bar graph, line plot, line graph, table</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Average (mean), most frequent (mode), middle term (median)</td>
<td><em>Everyday Mathematics</em> 2.10</td>
<td>Finding the Balance Point</td>
<td><em>Van De Walle</em> p. 401</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

  ● 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

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

   SL 7.11
   Everyday Mathematics 7.11 & 7.12

3. Predict probabilities in a variety of situations (e.g., given the number of items of each color in a bag, what is the probability that an item picked will have a particular color).

   Journal prompts
   Color Tile Sampling
   Roll 2 dice
   Tiles in Three Bags
   Pigs, testing pig strategies

  ● What students think will happen (intuitive)
  ● Collect data and use that data to predict the probability (experimental)

   Matching line plots with spinners
   Is there such a thing as a lucky coin?
   Spin City
   Is it fair?

  ● Analyze all possible outcomes to find the probability (theoretical)

   Observation of students
   Applets:
   Preset Spinner
   Dice Sums
   Coin Toss

   NCTM Navigating through Data Analysis and Probability 3-4, M. Burns, 1995

   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
   Attribute Acrobatics, Sternberg Activity Resources, 1974
   Difference Chains
   Difference Grids
   Difference Problems
   Venn Diagram on Math Arena
   Math Arena

   - Venn diagrams
   - Numerical and alphabetical order

   Exit slip: I played ____ today. I liked ____.

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

   Completion of worksheet
   Completion of worksheet
   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).
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.

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.

www.csm.aestate.edu/Nim.html-2k
Probability 3-4, M. Burns, 1995
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>
<tr>
<th>Knowledge/Skills/Understandings</th>
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</thead>
<tbody>
<tr>
<td><strong>A. Problem Solving</strong></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>Extension: Newspaper article</td>
<td>The Product Game Lesson: The Factor Game</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>Triangles Lesson: What's Important about Triangles?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Teacher observation</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>Students share and teacher records on a class chart</td>
<td>Match or No Match</td>
<td>Problem Solving Lessons, Marilyn Burns, Math Solutions, 1996</td>
</tr>
<tr>
<td>● Open ended problems</td>
<td>Teacher collects papers and responds with post-it &quot;nudge notes&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>● Non-routine problems</td>
<td>Check your understanding</td>
<td></td>
<td></td>
</tr>
<tr>
<td>● Problems with multiple solutions</td>
<td></td>
<td></td>
<td>Young Children Reinvent Arithmetic, Kamii &amp; Housman, Teachers College Press, 2000</td>
</tr>
<tr>
<td>● Problems that can be solved in several ways</td>
<td></td>
<td></td>
<td>NJ Curriculum Framework grade 3-4</td>
</tr>
<tr>
<td>3. Select and apply a variety of appropriate problem-solving strategies to solve problems.</td>
<td></td>
<td></td>
<td>Standard 1: Problem Solving</td>
</tr>
</tbody>
</table>
### Flemington-Raritan School District Mathematics Curriculum

1. **Communication**
   - **B. Communication**
     1. Use communication to organize and clarify their mathematical thinking

<table>
<thead>
<tr>
<th>Activity</th>
<th>Description</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completion of tally sheet</td>
<td>Count on Mathematics for Number Sense</td>
<td>NCTM.org, Illuminations lesson</td>
</tr>
<tr>
<td>Completion of worksheet</td>
<td>Literature Link: <em>A Tale of Two Stories: Pigging Out</em></td>
<td>NCTM.org, Illuminations lesson</td>
</tr>
<tr>
<td>Collect and respond with post-it &quot;nudge note&quot;</td>
<td>Explain to a student in 2nd grade what you learned about decimals today</td>
<td>Van De Walle p. 70</td>
</tr>
<tr>
<td>Writing Prompt:</td>
<td>What about the work we did today was easy? What was hard? What do you still have questions about?</td>
<td><em>Classroom Discussions: Using Math Talk to Help Students Learn</em>, Chapin O'Connor, Canavan/Anderson Math Solutions, 2003</td>
</tr>
<tr>
<td>Math Congress: Teacher uses scoring rubric for feedback to students</td>
<td>Parent Volunteers</td>
<td>Best of Math Exemplars II CD Rom</td>
</tr>
</tbody>
</table>

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).

Exit slip Exploration of a Balance Lesson: Maintaining the Balance Shifting the Balance
Completion of worksheet Games, Measurement, and Statistics Lesson: Pitching Cards

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

Students create a class book of their own Literature Link: Only One Literature Link: The Important Book

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

Everyday Mathematics Assessment 12.7 Everyday Mathematics Rates 12.1 - 12.5
Unit 12 Warm-up Quiz Everyday Mathematics Project 7: Numbers Maya Style

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

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

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

D. Reasoning

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

Class posters to be used for math congress Mathematics and Environmental Concerns Lesson: How to Bag It
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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<table>
<thead>
<tr>
<th>Flemington-Raritan School District Mathematics Curriculum</th>
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<tbody>
<tr>
<td>Completion of worksheet followed by class discussion</td>
</tr>
<tr>
<td>Class Brainstorm: can we find all possible combinations?</td>
</tr>
<tr>
<td>Math Congress</td>
</tr>
<tr>
<td>Partners create organized list of all possible combinations</td>
</tr>
<tr>
<td>Journal prompt: I used the strategy of ____ to guess the sequence of colors.</td>
</tr>
<tr>
<td>Numbers and Language</td>
</tr>
<tr>
<td>Lesson: Post Office Numbers</td>
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<tr>
<td>Possible Solution Sets</td>
</tr>
<tr>
<td>Lesson: Create an Address Number</td>
</tr>
<tr>
<td>Roads to Reasoning Packets Grade 4</td>
</tr>
<tr>
<td>Build the Yellow Hexagon</td>
</tr>
<tr>
<td>The Last Block with Pattern Blocks</td>
</tr>
<tr>
<td>Be a Logician with Color Tiles</td>
</tr>
<tr>
<td>Writing Prompt sheet # 31</td>
</tr>
<tr>
<td>Writing Prompt sheet # 36</td>
</tr>
</tbody>
</table>

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NCTM.org. Illuminations - lesson

Roads to Reasoning, Krulik & Rudwick, Creative Publications, 2001
Super Source CD Rom Video Clip # 2, Cuisenaire Co., 1996
Super Source CD Rom lesson, Cuisenaire Co., 1996, p. 62
Super Source CD Rom lesson, Cuisenaire Co., 1996, p. 18
NCTM 2001 Yearbook: Promoting the Use of Diagrams as Tools for Thinking, pp. 77-89
NCTM 1999 Yearbook: Reasoning About Operations, pp. 62-81
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

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)
   Math Congress/class discussion

   Virtual Tile Turning
   Applets:
   Patterns
   Shape Tool (Illuminations)

   Math Congress/class discussion

   NCTM On-Math Journal, Spring 2003, (members only), Printed copy of article attached.

   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). A39
### 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>Hands On Equations</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>Mid-Year Benchmark Assessment</td>
<td>1</td>
<td>End-of-the-Year Benchmark Assessment</td>
<td>1</td>
</tr>
</tbody>
</table>
**Flemington-Raritan School District**  
**Mathematics Curriculum**

Grade: 4 - Gifted and Talented  
**Topic 4.1 Number and Numerical Operations**  
**Essential Question:** How can problems in the real world be solved with mathematics?  
How can estimation be useful to us?  
How do numbers help us reason out solutions to problems?  
How do basic operations help us understand numbers?

<table>
<thead>
<tr>
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<tbody>
<tr>
<td><strong>A. Number Sense</strong></td>
<td>Teacher observation</td>
<td>Practice Master pm 5-41, 5-82</td>
<td>Open Court, 1991</td>
</tr>
<tr>
<td>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).</td>
<td>Teacher made exit slips (attachment 3)</td>
<td>Pizzazz, E-61</td>
<td><em>Everyday Mathematics</em> Units 5, 6, and 8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&quot;Pattern Blocks&quot;</td>
<td><em>Name That Portion</em>, TERC, 1996</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Variety of Games</td>
<td><em>Middle School with Pizzazz</em>, Booke</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Whole Class Discussion</td>
<td><em>Teaching Children Mathematics</em>, Janet Caldwell, November 1995</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&quot;Fraction Track&quot;</td>
<td>TERC, <em>Name That Portion</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td>&quot;Geoboard Puzzles&quot;</td>
<td>Geoboard Puzzles (attachment 4 &amp; 5)</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
Flemington-Raritan School District
Mathematics Curriculum

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

State assessment

"Capture Decimals"
Mental Math & Reflexes,
Everyday Mathematics 2.5

TERC, Name That Portion

Everyday Mathematics - 5
Units 2,4,5

Do Now: Mental Math & Reflexes
(Everyday Mathematics 2.10)
First to 100

Problem Parade

"Number Names"

Everyday Mathematics - 5
Units 2,4,7

PM 5-59
Pizzazz C-25, C-74

Open Court (1991)

"The Sieve of Eratosthenes"

Middle School with Pizzazz

"Deficient, Abundant, & Perfect Numbers"

Everyday Mathematics - 5
Unit 1

Multiplication - Grade 3, M.
Burns, 1991

Teaching Children
Mathematics, May 1997

Practice Masters, Open Court,
1991

Logic Number Problems

Everyday Mathematics - 5,
Project 1,2
Flemington-Raritan School District
Mathematics Curriculum

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. Everyday Mathematics - 5
   Performing addition and subtraction 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.

- Everyday Mathematics - 5 Unit 4 Assessment
- Math Congress

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

Whole Class Division Review

Assessment Project 3

About Teaching Mathematics, Marilyn Burns (2000)

Middle School with Pizzazz

Everyday Mathematics - 5, Unit 4

Assessment

"Ancient Multiplication Algorithm"

Everyday Mathematics - 5

Units 2, 4, 5, 6, 8

Everyday Mathematics - 5

Project 3

Pizzazz D-28, D-21

Units 5, 6

Notes from class

Small group work

Student presentations

Supplemental enrichment activities

Everyday Mathematics - 5

Units 1, 2, 3, 8, 10


Crossmatics, Dudley, 1990

Logic Number Problems, Wade H. Sherard III, 1987
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>
<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>
<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>&quot;Polygon Capture&quot;</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>
<td></td>
<td></td>
</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;Geodeo's Sorting Scheme&quot;</td>
<td>&quot;Navigational through Geometry in Grades 6-8, 2001&quot;</td>
</tr>
<tr>
<td>• Triangles by angles &amp; sides</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Quadrilaterals, including squares, rectangles, parallelograms, trapezoids, rhombi</td>
<td></td>
<td></td>
<td>&quot;The Greedy Triangle, Marilyn Burns, 1994&quot;</td>
</tr>
<tr>
<td>• Polygons by number of sides</td>
<td></td>
<td></td>
<td>&quot;Geoshapes&quot;</td>
</tr>
<tr>
<td>• Equilateral, equiangular, regular</td>
<td></td>
<td></td>
<td>&quot;Geometry in the Middle Grades (6-8), Illuminations&quot;</td>
</tr>
<tr>
<td>• All points equidistant from a given point form a circle</td>
<td></td>
<td></td>
<td>&quot;Geoshapes (games), Talicor, 1996&quot;</td>
</tr>
<tr>
<td>3. Identify similar figures.</td>
<td>Everyday Mathematics Unit 3 Assessment</td>
<td></td>
<td></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"
   - Everyday Mathematics - 5  
     Unit 9 Lesson 3
   - Everyday Mathematics - 5  
     Unit 3 Lesson 6
   - Tools, Illuminations

2. Recognize, identify, and describe geometric relationships and properties as they exist in nature, art, and other real-world settings.
   - "Geometry in the World of Art" - Grades 3-5
   - Everyday Mathematics - 5  
     Unit 3
   - Lesson, Illuminations

C. Coordinate Geometry

1. Create geometric shapes with specified properties in the first quadrant on a coordinate grid.
   - Everyday Mathematics Unit 9 Assessment
   - "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 - Unit 9 Lessons 4-7
   - Math by All Means: Geometry Grades 3-4, Marilyn Burns, 1994
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.

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.
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
## 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>A. Patterns</th>
<th>Assessments</th>
<th>Learning Experiences</th>
<th>Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Recognize, describe, extend, and create patterns involving whole numbers.</td>
<td>Unit 10 Assessment</td>
<td>&quot; Patterns that Grow&quot; (5 lessons)</td>
<td>&quot;Everyday Mathematics - 5 Units 1, 2, 7, 10&quot;</td>
</tr>
<tr>
<td>• Descriptions using tables, verbal rules, simple equations, and graphs</td>
<td>&quot;</td>
<td>Illuminations - &quot;Lessons&quot;</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>B. Functions &amp; Relationships</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Describe arithmetic operations as functions, including combining operations and reversing them.</td>
</tr>
<tr>
<td>2. Graph points satisfying a function from T-charts, from verbal rules, and from simple equations.</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>C. Modeling</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Use number sentences to model situations.</td>
</tr>
<tr>
<td>• Using variables to represent unknown quantities</td>
</tr>
<tr>
<td>• Using concrete materials, tables, graphs, verbal rules, algebraic expressions/equations</td>
</tr>
</tbody>
</table>
2. Draw freehand sketches of graphs that model real phenomena and use such graphs to predict and interpret events.
   - Changes over time
Flemington-Raritan School District

• 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
Grade: 4 Gifted and Talented  Topic 4.4 Data Analysis, Probability, and Discrete Mathematics

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

<table>
<thead>
<tr>
<th>Knowledge/Skills/Understandings</th>
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<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>
<tr>
<td>1. Collect, generate, organize, and display data.</td>
<td>Unit 6 Assessment</td>
<td>&quot;The Search for $1.00 Words&quot;</td>
<td><a href="http://www.mathsolutions.com">www.mathsolutions.com</a></td>
</tr>
<tr>
<td></td>
<td></td>
<td>&quot;Food Court&quot; grade 3-5 (6 lessons)</td>
<td>Attachment 2a &amp; b</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Everyday Mathematics Unit 6 Lessons - Illuminations</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Lessons - Illuminations Everyday Mathematics - 5 Unit 5 Lesson 10, 11</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Lessons - Illuminations Everyday Mathematics - 5 Unit 6</td>
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<tr>
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<td></td>
<td></td>
<td>Lessons - Illuminations Everyday Mathematics - 5 Unit 10 Lesson 7</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Lessons - Illuminations Everyday Mathematics - Unit 6</td>
</tr>
<tr>
<td>2. Read, interpret, select, construct, analyze, generate questions about, and draw inferences from displays of data.</td>
<td>Unit 6 Assessment</td>
<td>&quot;Information Represented Graphically&quot;</td>
<td></td>
</tr>
<tr>
<td>• Data generated from surveys</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Bar graph, line graph, circle graph, table</td>
<td></td>
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</tr>
<tr>
<td>• Range, median, and mean</td>
<td></td>
<td>&quot;Problem Solving: Dealing with&quot;</td>
<td></td>
</tr>
<tr>
<td>3. Respond to questions about data and generate their own questions and hypotheses.</td>
<td>Unit 6 Assessment</td>
<td></td>
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</tr>
</tbody>
</table>

**B. Probability**
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

   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).

   Circulate, complete, and share

   "map coloring"
   "The Handshake Problem"

   Think, pair, share

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

   Discrete Mathematics Workshop, Lisa Ryden, September 2000

   About Teaching Mathematics, Marilyn Burns, 2000

   Discrete Mathematics Across the Curriculum K-12, Yearbook NCTM, 1991

   Everyday Mathematics - Units 2 & 12

   Math by All Means - Probability, Marilyn Burns, 1995

Flemington-Raritan School District Mathematics Curriculum

Unit 12 Assessment
First to 21 - Journal p. 176

Math Congress
"Is It Fair?"

Everyday Mathematics - 5 Unit 12

Everyday Mathematics - 5 Unit 6 Lesson 2

Everyday Mathematics - Unit 12

Teaching Children Mathematics

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

<table>
<thead>
<tr>
<th>A. Problem Solving</th>
<th>Assessments</th>
<th>Learning Experiences</th>
<th>Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Learn mathematics through problem solving, inquiry, and discovery.</td>
<td></td>
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</tr>
<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>
<td></td>
<td></td>
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</tr>
<tr>
<td>4. Pose problems of various types and levels of difficulty.</td>
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<td></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>

### B. Communication

1. Use communication to organize and clarify their

### Notes

*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
  - Tiguou, Constance Kamii
  - SET - www.setgame.com
  - Frameworks - First 4 Standards - Grades 5-6
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)
   
   Fraction Factory (out of print)

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
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

Navigation Series
Tesselmania

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?

<table>
<thead>
<tr>
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<th>Resources</th>
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</thead>
<tbody>
<tr>
<td>A. Number Sense</td>
<td><strong>Everyday Mathematics</strong> Assessments 2 4 6 and 9 Teacher made tests/quizzes White Boards Student sharing Exit Slips</td>
<td>Direct Instruction * collaborative learning * Written explanations Land Fractions Open Ended Tinkerplots SketchPad Everyday Math Game CMLs Menu of Problems Cuisenaire Rods</td>
<td><strong>A Collection of Math Lessons,</strong> Marilyn Burns <strong>Problem Parade</strong> Doug Monteath &amp; Don Volle Continental Math League monthly problems <strong>Mathematics Teaching in Middle School</strong> <strong>Middle School with Pizzazz:</strong> &quot;Mathematics Teaching in Middle School&quot; (May 1997) Van de Walle books <strong>Everyday Math Books 1 and 2</strong> Hand on Equations <strong>About Teaching Mathematics,</strong> Marilyn Burns <strong>Developing Number Sense Series,</strong></td>
</tr>
</tbody>
</table>

- 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.
Grades: 5th Gifted and Talented Topic 4.2 Geometry and Measurement

**Essential Questions:**
1. How can knowledge of geometric properties help in problem solving situations?
2. How can coordinate grid systems help in understanding locations?
3. How does the mathematics of geometry enable us to wonder and understand our natural and physical world?

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<tr>
<td>A. Geometric Properties</td>
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<td></td>
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</tbody>
</table>

- 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°
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).
### Flemington-Raritan School District
Mathematics Curriculum

**Grade: 5th Gifted and Talented  **  
**Topic 4.3 Patterns and Algebra**

**Essential Questions:**
How can patterns help in problem solving?
How can symbols be used to help us in problem solving?
How does the study of algebra help us understand mathematical patterns as the patterns found in nature & the real world?

<table>
<thead>
<tr>
<th>Knowledge/Skills/Understandings</th>
<th>Assessments</th>
<th>Learning Experiences</th>
<th>Resources</th>
</tr>
</thead>
</table>
| A. Patterns | Everyday Mathematics Assessments 4, 6, 8 & 9  
Teacher made tests/quizzes  
White Boards  
Student sharing  
Exit Slips  
Mental Math | Modeling/Collaborative Activity  
Direct Instruction  
* collaborative learning  
* Written explanations  
Various puzzles  
Open Ended  
Tinkerplots  
SketchPad  
Everyday Math Game  
CMLs  
Menu of Problems  
Cuisenaire Rods  
Group Investigation | Everyday Mathematics unit 3, 6, 8, 9;  
NCTM Addendum Grades 5-8, Patterns & Functions  
Van de Walle pg 417-435 Chap. 18-21 22-25; |

- Descriptions using tables, verbal and symbolic rules, expressions, simple equations or graphs.
- Finite and infinite sequences
- Formal iterative formulas
- Recursive patterns, including Pascal's Triangle and the Fibonacci Sequence: 1, 1, 2, 3, 5, 8
- Generating sequences by using calculators to repeatedly apply a formula

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 (\(<, \leq\) )

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:
- 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?

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<tbody>
<tr>
<td><strong>A. Data Analysis</strong></td>
<td></td>
<td></td>
<td></td>
</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. | | | |
| • Bar graph, line graph, circle graph, table, histogram | | | |
| • Range, median, and mean | | | |

- Discrete Math packet
● 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 $3 \times 4 = 12$ outfits using 3 shirts and 4 skirts).
   - Number of ways a specified number of items can be arranged in order (concept of permutation)
   - Number of ways of selecting a slate of officers from a class
3. List the possible combinations of two elements chosen from a given set (e.g., forming a committee of two from a group of 12 students, finding how many handshakes there will be among ten people if everyone shakes each other person's hand once).

4. Explore counting problems involving Venn diagrams with two attributes.

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

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

1. Devise strategies for winning simple games and express those strategies as sets of diagrams.

2. Analyze vertex-edge graphs and tree diagrams.
   - Can a picture or a vertex-edge graph be drawn with a single line? (degree of vertex)
   - Can you get from any vertex to any other vertex? (connectedness)

3. Use vertex-edge graphs to find solutions to practical problems.
   - Delivery route that stops at specified sites but involves less travel
   - Shortest route from one site on a map to another.
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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?

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

Math Curse
Sir Circumference

Everyday Mathematics, Unit 8 Lesson 5
Everyday Mathematics, Unit 8 Lesson 1 2
Everyday Mathematics, embedded throughout
Hands-On Algebra, Book III
Everyday Mathematics, Unit 4 Lesson 10

About Teaching Mathematics,
M. Burns, pages 102 and 105
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, to check the correctness of their problem solutions.

5. Make and investigate mathematical conjectures.
   - Counterexamples as a means of displaying conjectures
   - Verifying conjectures using informal reasoning or proofs.

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

E. Representations
1. Create and use representations to organize, record, and communicate mathematical ideas.
   - Concrete representations (e.g., base-ten blocks or algebra tiles)
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- Pictorial representations (e.g., diagrams, charts, or tables)
- Symbolic representations (e.g., a formula)
- Graphical representations (e.g., a line graph)

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

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

F. Technology

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

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

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

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

5. Use computer software to make and verify conjectures about geometric objects.
6. Use computer-based laboratory technology for mathematical applications in the sciences (cf. science standards).
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 cad 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 he 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)
## 6th Grade Supplemental Resources

<table>
<thead>
<tr>
<th>Title of Resource</th>
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<tr>
<td><em>Algebra With Pizzazz</em></td>
<td>Steve Marcy, Janis Marcy</td>
<td>McGraw Hill</td>
<td>2002</td>
</tr>
<tr>
<td><em>Teaching Student Centered Math Grades 5-8, Vol 3</em></td>
<td>John Van DeWalle, LoAnn Lovin</td>
<td>Pearson Education</td>
<td>2006</td>
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<tr>
<td><em>Connected Mathematics - Prime Time</em></td>
<td>Lappan, Fey, Fitzgerald, Friel, Phillips</td>
<td>Prentice Hall</td>
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<td>Jerome Kaplan Ed.D</td>
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<td>Paul Lawrence</td>
<td>LL Teach, Inc.</td>
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<td>Findell, Greenes, Irvin, Tsankova</td>
<td>Wright Group</td>
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<td>Crystal Spring Books</td>
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<td>Joseph D. Lee</td>
<td>EPB Pan Pacific</td>
<td>2006</td>
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<td>John A. Van DeWalle</td>
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<td>Nicholas Jackiw</td>
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<td><em>Explain It!</em></td>
<td>Lepore, Fleetwood, Hall</td>
<td>Creative Publications</td>
<td>2001</td>
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<td><em>Get It Together - Math Problems for Groups Grades 4-12</em></td>
<td>Tim Erickson</td>
<td>Lawrence Hall of Science</td>
<td>1989</td>
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# Mathematics Curriculum

6th Grade Supplemental Resources (continued)

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<tr>
<td>United We Solve- Math Problems for Groups Grades 5-10</td>
<td>Tim Erickson</td>
<td>Eeps</td>
<td>1996</td>
</tr>
<tr>
<td>Brain Pop Subscription</td>
<td></td>
<td><a href="http://www.brainpop.com">www.brainpop.com</a></td>
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# 6th Grade Algebra 1A Supplemental Resources

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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:
  o (old 4.1#1) count forward beginning from a given number within the known sequence (instead of having to begin at 1)
  o (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).
  o (old 4.1#1) understand that the number of objects is the same regardless of their arrangement of the order in which they were counted.
  o understand that each successive number name refers to a quantity that is one larger.

Comparing Numbers
Children will:
  o (old 4.1#5) have opportunities to determine which group contains the most or least objects.
  o Display written numerals from 1 to 10.

Operations & Algebraic Thinking
Children will:
  o (old 4.1 B #1) represent addition and subtraction with mental images, drawings, verbal explanations, expressions, or equations.
  o solve addition and subtraction word problems, add and subtract within 10, e.g., by using objects or drawings to represent the problem.
  o (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)
  o 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.
  o fluently add and subtract within 5.

Classify Objects and Count the Number of Objects in Each Category
Children will:
  o (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:
  o (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; ie. The number of rows and columns (area), and fraction of whole.
Flemington-Raritan Regional School District
Flemington, New Jersey

K-6
Mathematics Curriculum Addendum

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Council of Instruction Review Date: May 9, 2012
BOE Curriculum Committee Review Date: June 7, 2012
Board of Education Approval Date: June 18, 2012
Alignment to Common Core Standards in Mathematics

The following grade level addendums describe the areas in need of greater focus as defined by the Common Core Standards for Mathematics for each grade level. A description of what students will do to demonstrate understanding is given.
Kindergarten Addendum to Curriculum

Counting & Cardinality
Children will:
- (old 4.1#1) count forward beginning from a given number within the known sequence (instead of having to begin at 1)
- (old 4.1#2) write numbers from 0 to 20. Represent a number of objects with a written numeral 0-20 (with 0 representing a count of no objects).
- (old 4.1#1) understand that the number of objects is the same regardless of their arrangement or the order in which they were counted.
- understand that each successive number name refers to a quantity that is one larger.

Comparing Numbers
Children will:
- (old 4.1#5) have opportunities to determine which group contains the most or least objects.
- Display written numerals from 1 to 10.

Operations & Algebraic Thinking
Children will:
- (old 4.1 B #1) represent addition and subtraction with mental images, drawings, verbal explanations, expressions, or equations.
- solve addition and subtraction word problems, add and subtract within 10, e.g., by using objects or drawings to represent the problem.
- (old 4.1 B #3) decompose numbers less than or equal to 10 into pairs in more than one way, e.g., by using objects or drawings, and record each decomposition by a drawing or equation (e.g., $5 = 2 + 3$ and $5 = 1 + 4$)
- for any number from 1 to 9, find the number that makes 10 when added to the given number, e.g., by using objects or drawings, and record the answer with a drawing or equation.
- fluently add and subtract within 5.

Classify Objects and Count the Number of Objects in Each Category
Children will:
- (old 4.4#2) classify objects into given categories; count the numbers of objects in each category and sort the categories by count (limiting the category counts to be less than or equal to 10)

Geometry
Children will:
- (old 4.2#2) compose simple shapes to form larger shapes. For example, “Can you join these two triangles with full sides touching to make a rectangle?”
Grade 1 Addendum to Curriculum

Operations and Algebraic Thinking 1.OA

A. Represent and solve addition and subtraction problems:

1.OA.1. Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.

1.OA.2. Solve word problems that call for addition of three whole numbers whose sum is less than or equal to 20, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.

B. Work with addition and subtraction equations.

1.OA.7. Understand the meaning of the equal sign, and determine if equations involving addition and subtraction are true or false. For example, which of the following equations are true and which are false? 6 = 6, 7 = 8 – 1, 5 + 2 = 2 + 5, 4 + 1 = 5 + 2.

1.OA.8. Determine the unknown whole number in an addition or subtraction equation relating three whole numbers. For example, determine the unknown number that makes the equation true in each of the equations 8 + ? = 11, 5 = □ – 3, 6 + 6 = □

C. Extend the counting sequence.

1.NBT.1. Count to 120, starting at any number less than 120. In this range, read and write numerals and represent a number of objects with a written numeral.

D. Use place value understanding and properties of operations to add and subtract.

1.NBT.4. Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten.

1.NBT.5. Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used.

1.NBT.6. Subtract multiples of 10 in the range 10-90 from multiples of 10 in the range 10-90 (positive or zero differences), using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.
Measurement and Data 1.MD

A. Measure lengths indirectly and by iterating length units.
   1.MD.1. Order three objects by length; compare the lengths of two objects indirectly by using a third object.

B. Tell and write time.
   1.MD.3. Tell and write time in hours and half-hours using analog and digital clocks.

Geometry 1.G

A. Reason with shapes and their attributes.
   1.G.1. Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus non-defining attributes (e.g., color, orientation, overall size); build and draw shapes to possess defining attributes.
   1.G.2. Compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quarter-circles) or three-dimensional shapes (cubes, right rectangular prisms, right circular cones, and right circular cylinders) to create a composite shape, and compose new shapes from the composite shape. [Students do not need to learn formal names such as “right rectangular prism.” (Footnote to Common Core State Standards)]
   1.G.3. Partition circles and rectangles into two and four equal shares, describe the shares using the words halves, fourths, and quarters, and use the phrases half of, fourth of, and quarter of. Describe the whole as two of, or four of the shares. Understand for these examples that decomposing into more equal shares creates smaller shares.
Grade 2 Addendum to Curriculum

Operations and Algebraic Thinking 2.OA

A. Represent and solve problems involving addition and subtraction.
   2.OA.1. Use addition and subtraction within 100 to solve one- and two-
   step word problems involving situations of adding to, taking from, putting
   together, taking apart, and comparing, with unknowns in all positions,
   e.g., by using drawings and equations with a symbol for the unknown
   number to represent the problem.

B. Work with equal groups of objects to gain foundations for multiplication
   2.OA.3. Determine whether a group of objects (up to 20) has an odd or
   even number of members, e.g., by pairing objects or counting them by 2s;
   write an equation to express an even number as a sum of two equal
   addends.
   2.OA.4. Use addition to find the total number of objects arranged in
   rectangular arrays with up to 5 rows and up to 5 columns; write an
   equation to express the total as a sum of equal addends.

Number and Operations in Base Ten 2.NBT

A. Understand place value
   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.
   2.NBT.3. Read and write numbers to 1000 using base-ten numerals,
   number names, and expanded form.
   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.

B. Use place value understanding and properties of operations to add and
   subtract.
   2.NBT.6. Add up to four two-digit numbers using strategies based on
   place value and properties of operations.
   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.
   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. Measure and estimate lengths in standard units.
   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. Relate addition and subtraction to length
   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.
   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.

C. Work with time and money
   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)
   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?

D. Represent and interpret data.
   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.

** De-emphasize probability, discrete math and venn diagrams – moved to upper grades

Geometry  2.G

A. Reason with shapes and their attributes
   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)
Perimeter is postponed to grade 3 but KEEP area and multiplication model
   2.G.3. Partition circles and rectangles into two, three, or four equal shares, describe the shares using the words halves, thirds, half of, a third
of, etc., and describe the whole as two halves, three thirds, four fourths. Recognize that equal shares of identical wholes need not have the same shape.

Geometry is used to show multiplication and fractions; ie. The number of rows and columns (area), and fraction of whole.
Grade 3 Addendum to Curriculum

Numbers and Operations in Base Ten 3.NBT

A. Use place value understanding and properties of operations to perform multi-digit arithmetic.
   3.NBT.3. Multiply one-digit whole numbers by multiples of 10 in the range 10–90 (e.g., 9 × 80, 5 × 60) using

Number and Operations- Fractions 3.NF

A. Develop understanding of fractions as numbers.
   3.NF.2. Understand a fraction as a number on the number line; represent fractions on a number line diagram.
   a. Represent a fraction 1/b on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into b equal parts. Recognize that each part has size 1/b and that the endpoint of the part based at 0 locates the number 1/b on the number line.

   b. Represent a fraction a/b on a number line diagram by marking off a lengths 1/b from 0. Recognize that the resulting interval has size a/b and that its endpoint locates the number a/b on the number line.
   3.NF.3. Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.
   a. Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line.
   b. Recognize and generate simple equivalent fractions, e.g., 1/2 = 2/4, 4/6 = 2/3). Explain why the fractions are equivalent, e.g., by using a visual fraction model.
   c. Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. Examples: Express 3 in the form 3 = 3/1; recognize that 6/1 = 6; locate 4/4 and 1 at the same point of a number line diagram.
   d. Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.
Measurement and Data 3.MD

Telling time to the nearest minute has moved from 2nd grade to 3rd grade.

A. Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.
   3.MD.1. Tell and write time to the nearest minute and measure time intervals in minutes. Solve word problems involving addition and subtraction of time intervals in minutes, e.g., by representing the problem on a number line diagram.
   3.MD.2. Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l).1 Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem. More emphasis is placed on metric measurement.
   3.MD.4. Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units—whole numbers, halves, or quarters.

B. Represent and interpret data.
   3.MD.3. Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step “how many more” and “how many less” problems using information presented in scaled bar graphs. For example, draw a bar graph in which each square in the bar graph might represent 5 pets.

C. Geometric measurement: understand concepts of area and relate area to multiplication and to addition.
   3.MD.7. Relate area to the operations of multiplication and addition.
      c. Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths $a$ and $b + c$ is the sum of $a \times b$ and $a \times c$. Use area models to represent the distributive property in mathematical reasoning.
      d. Recognize area as additive. Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real world problems.

De-emphasize formal lessons on lines of symmetry, transformations, probability, discrete math (tree diagrams, combinations)
Grade 4 Addendum to Curriculum

Operations and Algebraic Thinking 4.OA

A. Use the four operations with whole numbers to solve problems.
   4.0A2. Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.
   4.0A3. Solve multi-step word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.

B. Gain familiarity with factors and multiples
   4.0A4. Find all factor pairs for a whole number in the range 1–100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1–100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1–100 is prime or composite.

Number and Operations—Fractions 4.NF

A. Extend understanding of fraction equivalence and ordering.
   4.NF1. Explain why a fraction $a/b$ is equivalent to a fraction $(n \times a)/(n \times b)$ by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.

B. Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.
   4.NF3. Understand a fraction $a/b$ with $a > 1$ as a sum of fractions $1/b$.
   a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.

   b. Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model. Examples: $3/8 = 1/8 + 1/8 + 1/8$; $3/8 = 1/8 + 2/8$; $2 \ 1/8 = 1 + 1/8 = 8/8 + 8/8 + 1/8$.

   c. Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or
by using properties of operations and the relationship between addition and subtraction.

d. Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.

4.NF4. Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.

   a. Understand a fraction \( \frac{a}{b} \) as a multiple of \( \frac{1}{b} \). For example, use a visual fraction model to represent \( \frac{5}{4} \) as the product \( 5 \times \left(\frac{1}{4}\right) \), recording the conclusion by the equation \( \frac{5}{4} = 5 \times \left(\frac{1}{4}\right) \).

   b. Understand a multiple of \( \frac{a}{b} \) as a multiple of \( \frac{1}{b} \), and use this understanding to multiply a fraction by a whole number. For example, use a visual fraction model to express \( 3 \times \left(\frac{2}{5}\right) \) as \( 6 \times \left(\frac{1}{5}\right) \), recognizing this product as \( 6/5 \). (In general, \( n \times \left(\frac{a}{b}\right) = \left(n \times \frac{a}{b}\right) \).

   c. Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem. For example, if each person at a party will eat \( \frac{3}{8} \) of a pound of roast beef, and there will be 5 people at the party, how many pounds of roast beef will be needed? Between what two whole numbers does your answer lie?

Measurement and Data 4.MD

A. Solve problems involving measurement and conversion of measurement from a larger unit to a smaller unit.

   4.MD.2. Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.

B. Geometric measurement: understand concepts of angle and measure angles.

   4.MD.7. Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure.

De-emphasize formal lessons on lines of symmetry, transformations, probability, discrete math (tree diagrams, combinations)
Grade 5 Addendum to Curriculum

Operations and Algebraic Thinking 5.OA

A. Write and interpret numerical expressions.
   5.OA.1. Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.

Number and Operations in Base Ten 5.NBT

A. Understand the place value system.
   5.NBT.1. Recognize that in a multi-digit number, a digit in one place represents
   10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left.
   5.NBT.2. Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.

B. Perform operations with multi-digit whole numbers and with decimals to hundredths.
   5.NBT.5. Fluently multiply multi-digit whole numbers using the standard algorithm.
   5.NBT.7. Add, subtract, multiply, and divide decimals to hundredths, 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.

Number and Operations—Fractions 5.NF

A. Apply and extend previous understandings of multiplication and division to multiply and divide fractions.
   5.NF.4. Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction.
   a. Interpret the product \((a/b) \times q\) as \(a\) parts of a partition of \(q\) into \(b\) equal parts; equivalently, as the result of a sequence of operations \(a \times q \div b\). For example, use a visual fraction model to show \((2/3) \times 4 = 8/3\), and create a story context for this equation. Do the same with \((2/3) \times (4/5) = 8/15\). (In general, \((a/b) \times (c/d) = ac/bd\).)

   b. Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas.
5.NF.5. Interpret multiplication as scaling (resizing), by:
   a. Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication.

   b. Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence \( \frac{a}{b} = \frac{(n \times a)}{(n \times b)} \) to the effect of multiplying \( \frac{a}{b} \) by 1.

5.NF.6. Solve real-world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem.

5.NF.7. Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.\(^1\)

\( ^1\) Students able to multiply fractions in general can develop strategies to divide fractions in general, by reasoning about the relationship between multiplication and division. But division of a fraction by a fraction is not a requirement at this grade.

a. Interpret division of a unit fraction by a non-zero whole number, and compute such quotients. For example, create a story context for \( \frac{1}{3} \div 4 \), and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that \( \frac{1}{3} \div 4 = \frac{1}{12} \) because \( \frac{1}{12} \times 4 = \frac{1}{3} \).

b. Interpret division of a whole number by a unit fraction, and compute such quotients. For example, create a story context for \( 4 \div \frac{1}{5} \), and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that \( 4 \div \frac{1}{5} = 20 \) because \( 20 \times \frac{1}{5} = 4 \).

c. Solve real-world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, e.g., by using visual fraction models and equations to represent the problem. For example, how much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 1/3-cup servings are in 2 cups of raisins?
Measurement and Data 5.MD

A. Represent and interpret data.

2.MD.2. Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots. For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.

B. Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.

5.MD.3. Recognize volume as an attribute of solid figures and understand concepts of volume measurement.
   a. A cube with side length 1 unit, called a “unit cube,” is said to have “one cubic unit” of volume, and can be used to measure volume.

   b. A solid figure which can be packed without gaps or overlaps using $n$ unit cubes is said to have a volume of $n$ cubic units.

5.MD.4. Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.

5.MD.5. Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.
   a. Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent threefold whole-number products as volumes, e.g., to represent the associative property of multiplication.

   b. Apply the formulas $V = l \times w \times h$ and $V = b \times h$ for rectangular prisms to find volumes of right rectangular prisms with whole-number edge lengths in the context of solving real world and mathematical problems.

   c. Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems.

Geometry 5.G

A. Graph points on the coordinate plane to solve real-world and mathematical problems.

5.G.1. Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second
number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., $x$-axis and $x$-coordinate, $y$-axis and $y$-coordinate).

B. **Classify two-dimensional figures into categories based on their properties.**

5.G.3. Understand that attributes belonging to a category of two dimensional figures also belong to all subcategories of that category.

*For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles.*
Grade 6 Addendum to Curriculum

Ratios and Proportional Relationships 6.RP

A. Understand ratio concepts and use ratio reasoning to solve problems.

6.RP.1. Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. For example, “The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak.” “For every vote candidate A received, candidate C received nearly three votes.”

6.RP.2. Understand the concept of a unit rate $a/b$ associated with a ratio $a:b$ with $b \neq 0$, and use rate language in the context of a ratio relationship. For example, “This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is $3/4$ cup of flour for each cup of sugar.” “We paid $75 for 15 hamburgers, which is a rate of $5 per hamburger.”

6.RP.3. Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.

b. Solve unit rate problems including those involving unit pricing and constant speed. For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed?

The Number System 6.NS

A. Compute fluently with multi-digit numbers and find common factors and multiples.

6.NS.2. Fluently divide multi-digit numbers using the standard algorithm.

B. Apply and extend previous understandings of numbers to the system of rational numbers.

6.NS.6 Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates.

b. Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes.

c. Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.


c. Understand the absolute value of a rational number as its distance...
from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation. For example, for an account balance of \(-30\) dollars, write \(|-30| = 30\) to describe the size of the debt in dollars.

d. Distinguish comparisons of absolute value from statements about order. For example, recognize that an account balance less than \(-30\) dollars represents a debt greater than 30 dollars.

6.NS.8. Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.

Expressions and Equations 6.EE

A. Apply and extend previous understandings of arithmetic to algebraic expressions.

6.EE.4. Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them). For example, the expressions \(y + y + y\) and \(3y\) are equivalent because they name the same number regardless of which number \(y\) stands for.

Statistics and Probability 6.SP

A. Develop understanding of statistical variability.

6.SP.1. Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers. For example, “How old am I?” is not a statistical question, but “How old are the students in my school?” is a statistical question because one anticipates variability in students’ ages.

6.SP.2. Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape.

6.SP.5. Summarize numerical data sets in relation to their context, such as by:

b. Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.