FREEHOLD REGIONAL HIGH SCHOOL DISTRICT

OFFICE OF CURRICULUM AND INSTRUCTION

SPECIAL EDUCATION DEPARTMENT

MATH FOR: AUTISM SPECTRUM
COGNITIVE MILD
COGNITIVE MODERATE

Grade Level: 9-12+

Credits: 5

BOARD OF EDUCATION ADOPTION DATE:

AUGUST 25, 2008

SUPPORTING RESOURCES AVAILABLE IN DISTRICT RESOURCE SHARING
APPENDIX A: ACCOMMODATIONS AND MODIFICATIONS
APPENDIX B: ASSESSMENT EVIDENCE
APPENDIX C: INTERDISCIPLINARY CONNECTIONS
FREEHOLD REGIONAL HIGH SCHOOL
DISTRICT

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Course Philosophy

The Comprehensive Curriculum for the Autism Spectrum Program, Cognitive Mild Program, and Cognitive Moderate Program is to provide instructional opportunities that will lead to the acquisition of knowledge, skills, and competencies in Mathematics.

The goal of the program is to provide instructional opportunities that will lead to the acquisition of knowledge, skills, and competencies essential to leading productive, fulfilling, and successful lives as students continue their education, enter the workforce, and assume their civic responsibilities.

Course Description

The Math curriculum is designed to guide the planning of instruction and assessment of learning for students age fourteen to twenty-one. It provides a common set of goals and expectations in the areas of: Number and Numerical Operations, Geometry and Measurement, Patterns and Algebra, and Data Analysis, Probability, and Discrete Mathematics. Unit goals ensure that the Enduring Understanding is presented using varied techniques and strategies to provide students with knowledge that leads to success in society. Diagnostic, formative, and summative assessments enable the classroom teacher to determine a student’s skills at the beginning of the school year, progress made during the year, and documentation of cumulative skill attainment at the end of the year.

To appropriately address the educational needs of all students, differential instructional techniques have been incorporated into the curriculum to meet standard goals. The differential techniques permit instruction to meet the goals and objectives of the Individual Education Plan.
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<thead>
<tr>
<th>Unit Title</th>
<th>Unit Understandings</th>
<th>Recommended Duration</th>
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</table>
| Unit 1: Number Sense                     | Numerical reasoning uses real life experiences, physical materials and technology to construct meanings for numbers.  
1. Students will understand the various uses of numbers.  
2. Students will understand how to compare and order numbers.                                                                                          | 3 weeks              |
| Unit 2: Numerical Operations             | Computational fluency includes understanding the meaning and the appropriate use of numerical operations.  
1. Students will understand how to create and solve matrices.  
2. Students will understand how to check the reasonableness of results of computations.  
3. Students will understand techniques for solving equations systematically.                                                                              | 6 weeks              |
| Unit 3: Estimation                       | Context is critical when using estimation.  
1. Students will understand how to recognize when an estimate is appropriate, and understand the usefulness of an estimate as distinct from an exact answer.  
2. Students will understand how to use estimation to determine whether the result of a computation is reasonable.                                              | 3 weeks              |
| Unit 4: Geometric Properties and Transforming Shapes | Spatial sense and geometric relationships are a means to solve problems and make sense of a variety of phenomena.  
1. Students will understand geometric symbols, shapes and figures  
2. Students will understand how tessellations are generated.                                                                                | 4 weeks              |
| Unit 5: Coordinate Geometry              | Coordinate geometry can be used to represent and verify geometric/algebraic relationships. The functions and relationships concepts are fundamental ideas in mathematics.  
1. Students will understand how to find the distance between two points.  
2. Students will understand how to fit a line to data and make predictions.                                                                   | 3 weeks              |
| Unit 6: Measurement | Measurement is a tool to quantify a variety of phenomena. Measurement can be used to solve everyday problems through the use of different measuring tools.  
1. Students will understand how to select and use the standard units of measure and measurement tools.  
2. Students will understand how to measure and calculate the area, perimeter, circumference of geometric figures. | 4 weeks |
|--------------------|---------------------------------------------------------------------------------------------------------------|--------|
| Unit 7: Patterns, Functions and Relationships in Algebra | Patterns, functions and relationships can be represented graphically, numerically, symbolically, or verbally. Real world situations can be modeled by graphs and equations.  
1. Students will understand how to interpret patterns in real life situations.  
2. Students will understand how to evaluate expressions using order of operations.  
3. Students will use concrete and pictorial models to explore the basic concept of a function. | 3 weeks |
| Unit 8: Data Analysis | Reading, Understanding, interpreting, and communicating data are critical in modeling a variety of real-world situations, drawing appropriate inferences, making informed decisions, and justifying those decisions.  
1. Students will understand how to evaluate data for accuracy and reasonableness of conclusions drawn.  
2. Students will understand how to use sampling techniques to generate data and draw conclusions about large groups. | 3 weeks |
| Unit 9: Probability | Probability quantifies the likelihood that something will happen and enables us to make predictions and informed decisions.  
1. Students will understand how to calculate the probability of two events that occur simultaneously.  
2. Students will understand how to use chance devices to explore concepts of probability. | 3 weeks |
| Unit 10: Discrete Mathematics | Consists of tools and strategies for representing, organizing, and interpreting non-continuous data.  
1. Students will understand how to investigate ways to represent and classify data according to attributes.  
2. Students will understand how to apply the multiplication rule of counting in complex situation.  
3. Students will understand how to use networks and tree diagrams to represent everyday situations. | 2 weeks |
### Freehold Regional High School District
### Curriculum Map
### Math

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<thead>
<tr>
<th>Relevant Standards</th>
<th>Enduring Understandings</th>
<th>Essential Questions</th>
<th>Diagnostic (before)</th>
<th>Formative (during)</th>
<th>Summative (after)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1. 12 A Number Sense 1,2</td>
<td>Numeric reasoning involves fluency and facility with numbers.</td>
<td>How do mathematical ideas interconnect and build on one another to produce a coherent whole?</td>
<td>Teacher made pre-test to evaluate arithmetic skills. Anticipatory set</td>
<td>Teacher questions, Checklists, Activities Closure Questions, Review Games</td>
<td>Alternative assessments /Projects Unit Test.</td>
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<tr>
<td></td>
<td>A quantity can be represented in various forms. The relationships between them are critical to number sense.</td>
<td>How can numbers be represented?</td>
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<td>How can we compare and contrast numbers?</td>
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<tr>
<td>4.1. 12 B Numerical Operations 1,2,3</td>
<td>There are multiple methods for finding a mathematical solution and problem solving depends upon choosing appropriate methods.</td>
<td>What makes a computational strategy both effective and efficient?</td>
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<td>How do operations affect numbers?</td>
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<tr>
<td>4.1.12 C Estimation 1</td>
<td>Context is critical when using estimation.</td>
<td>How can we decide when to use an exact answer and when to use an estimate?</td>
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<td>How can an answer be judged reasonable or unreasonable?</td>
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<td>Relevant Standards</td>
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<tr>
<td>4.2.12 A Geometric Properties 1,2,3</td>
<td>Spatial sense and geometric relationships are a means to solve problems and make sense of a variety of phenomena and are important to real life application. Geometric properties can be used to construct geometric figures..</td>
<td>How can spatial relationships be described by careful use of geometric language? How do geometric relationships help to solve problems and/or make sense of phenomena?</td>
<td>Teacher made test to evaluate students' awareness of geometric vocabulary. Anticipatory set Oral Questions Teacher questions, Checklists, observations Closure questions Review games Journals Assignments Activities, Tests, Presentation, and projects Portfolios</td>
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<tr>
<td>4.2.12 B Transforming Shapes 3</td>
<td>Students will understand that manipulating two or more shapes will result in a tessellation.</td>
<td>Where would you see tessellations in the real world? How is a tessellation created?</td>
<td>Teacher made test to evaluate students' awareness of geometric vocabulary. Anticipatory set Oral Questions Teacher questions, Checklists, observations Closure questions Review games Journals Assignments Activities, Tests, Presentation, and projects Portfolios</td>
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<tr>
<td>4.2.12 C Coordinate Geometry</td>
<td>Coordinate Geometry can be used to represent and verify geometric /algebraic relationships.</td>
<td>What are the relationships between parallel lines, perpendicular lines and how they are related to the coordinate plane?</td>
<td>Teacher made test to evaluate students' awareness of geometric vocabulary. Anticipatory set Oral Questions Teacher questions, Checklists, observations Closure questions Review games Journals Assignments Activities, Tests, Presentation, and projects Portfolios</td>
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<tr>
<td>4.2.12 D Units of Measurement 2</td>
<td>Precise and accurate measurement is necessary to solve problems</td>
<td>Why is it necessary to use the appropriate tools (protractor, compass and tape measurement) to measure various Geometric shapes?</td>
<td>Teacher made test to evaluate students' awareness of geometric vocabulary. Anticipatory set Oral Questions Teacher questions, Checklists, observations Closure questions Review games Journals Assignments Activities, Tests, Presentation, and projects Portfolios</td>
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<tr>
<td>4.2.12 E Measuring Geometric Objects 2</td>
<td>Context is critical when using estimation.</td>
<td>What we measure affects how we measure it.</td>
<td>Teacher made test to evaluate students' awareness of geometric vocabulary. Anticipatory set Oral Questions Teacher questions, Checklists, observations Closure questions Review games Journals Assignments Activities, Tests, Presentation, and projects Portfolios</td>
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<tr>
<td>Relevant Standards(^2)</td>
<td>Enduring Understandings (Big Ideas)</td>
<td>Essential Questions</td>
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<tr>
<td>4.3.12 A Patterns 1</td>
<td>Algebra provides language through which we communicate the patterns in mathematics.</td>
<td>How can change be best represented mathematically? How can patterns, relations, and functions be used as tools to best describe and help explain real-life situations?</td>
<td>Teacher made test to evaluate students’ awareness of geometric vocabulary. Anticipatory set</td>
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<tr>
<td>4.3.12 B Functions and Relationships 1,2</td>
<td>Patterns, functions and relationships can be represented graphically and symbolically. The function and relationship concepts are fundamental ideas in mathematics.</td>
<td>How are patterns of change related to the behavior of functions?</td>
<td>Teacher questions, Checklists, Observations Closure questions Review games Oral Presentations</td>
<td></td>
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</tr>
<tr>
<td>4.3.12 C Modeling 1</td>
<td>Real world situations can be modeled by graphs and equations.</td>
<td>How can we use mathematical models to describe physical relationships? How can we use physical models to clarify mathematical relationships?</td>
<td>Oral Presentations Pair – Shared Activities</td>
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<tr>
<td>4.3.12 D Procedures 1,2</td>
<td>Algebraic numeric procedures are interconnected and build on one another leading to a stronger foundation of finding solutions.</td>
<td>What makes an algebraic algorithm both effective and efficient?</td>
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<table>
<thead>
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<tr>
<td>4.4.12 A Data Analysis 1,2</td>
<td>Reading, Understanding, interpreting, and communicating data are critical in modeling a variety of real-world situations, drawing appropriate inferences, making informed decisions, and justifying those decisions.</td>
<td>How can the collection, organization, interpretation, and display of data be used to answer questions?</td>
<td>Teacher made test to evaluate students’ awareness of relevant vocabulary. Anticipatory set</td>
</tr>
<tr>
<td>4.4.12 B Probability 3,4</td>
<td>Probability quantifies the likelihood that something will happen and enables us to make predictions and informed decisions.</td>
<td>How can attributes be used to classify data/objects? How can probability be used to make predictions and/or conclusions?</td>
<td>Teacher questions, Checklists, Activities, Observations, Closure questions, Review games</td>
</tr>
<tr>
<td>4.4.12 C Discrete Mathematics – Systematic Listing and Counting 1,2,3</td>
<td>Consists of tools and strategies for representing, organizing, and interpreting non-continuous data</td>
<td>How can attributes be used to classify data/objects? What is the best way to solve this? What counting strategy works best here?</td>
<td>Activities, tests, Presentation, Projects</td>
</tr>
<tr>
<td>4.4.12 D Discrete Mathematics - Vertex-Edge Graphs and Algorithms 1</td>
<td>Optimization is finding the best solution within given constraints.</td>
<td>How can visual tools such as networks (vertex-edge graphs) be used to answer questions? How can algorithmic thinking be used to solve problems?</td>
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<tr>
<td>Relevant Standards</td>
<td>Enduring Understandings (Big Ideas)</td>
<td>Essential Questions</td>
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<tr>
<td>4.5.12 A Problem Solving 1,2,3,4,5</td>
<td>Mathematics can be learned through problem solving and discovery</td>
<td>How can inquiry and discovery be infused with the power of mathematics?</td>
<td>Teacher made test to evaluate students’ awareness of relevant vocabulary. Anticipatory set</td>
</tr>
<tr>
<td>4.5.12 B Communication 1,2,3,4</td>
<td>Use communication to organize and clarify mathematical thinking</td>
<td>How can strong communication skills enhance the mathematical experience? How can a student’s new found knowledge be used to help others?</td>
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<tr>
<td>4.5.12 C Connections 1,2,3,4,6</td>
<td>Connections to mathematics can be applied to many other concentrations</td>
<td>How can connections in mathematics be helpful in the sciences, social sciences and the arts; and to the everyday world?</td>
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<tr>
<td>4.5.12 D Reasoning 1,2,3,4,6</td>
<td>With the development of mathematical reasoning comes the recognition that many real life situations can be quantified.</td>
<td>How can students use their ability to reason to conquer a wide array of mathematical problems?</td>
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<tr>
<td>4.5.12 E Representations 1,2,3</td>
<td>Various representations will enhance communication and problem solving skills.</td>
<td>What type of alternate perspectives can be used to present the problem and the solution?</td>
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<tr>
<td>4.5.12 F Technology 1,2,4</td>
<td>Tools should not be used to replace mental math and paper and pencil computation, but to enhance understanding of mathematics and the power to use mathematics.</td>
<td>How can the use of technology enhance the learning environment?</td>
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<td>How can we learn from the past to better the future?</td>
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</table>
Enduring Understandings: Numerical reasoning uses real life experiences, physical materials and technology to construct meanings for numbers.

Essential Questions: How do mathematical ideas interconnect and build on one another to produce a coherent whole? How can we compare and contrast numbers? How can numbers be represented? How can inquiry and discovery be infused with the power of mathematics? How can a student’s new found knowledge be used to help others? How can strong communication skills enhance the mathematical experience? What makes an algebraic algorithm both effective and efficient?

Unit Goals: 1. Students will understand the various uses of numbers.
2. Students will understand how to compare and order numbers.

Duration of Unit: 3 weeks
NJCCCS: 4.1 A, 4.3 D 4.5 A-C

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<tr>
<th>Guiding / Topical Questions</th>
<th>Content, Themes, Concepts, and Skills</th>
<th>Instructional Resources and Materials</th>
<th>Teaching Strategies</th>
<th>Assessment Strategies</th>
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<tbody>
<tr>
<td>Number Sense</td>
<td>Use real-life experiences, physical materials, and technology to construct meanings for numbers. Identify whole numbers through hundred thousands. Identify commonly used fractions as part of a whole, as a subset of a set, and as a location on a number line. Demonstrate an understanding of whole number place value concepts. Identify whether any whole number is odd or even. Explore the extension of the place value system to decimals through hundredths. Understand the various uses of numbers. Compare and order numbers.</td>
<td>Lecture, Notes, Transparencies, Power point presentations, Audio visual aids, Manipulatives, Internet and interactive displays and activities, Use current technology where available, Demonstrations, Hands on activities, Educational excursions, Graphic organizer, Textbook Ancillaries, Individual dry erase boards</td>
<td>Select and use the appropriate method for solving problems (mental math, paper and pencil or calculator). Organize numbers from largest to smallest using a number line. Use a place value chart to determine the place value of a digit. Use manipulatives to demonstrate relationships. Utilize computer software. Utilize math games. Money skills: identify, count, add, subtract, multiply, divide, make change, sales tax, interest, tip, commission, discount. Use guided and independent practice activities. Reinforce skills through computer software. Reinforce skills through games. Anticipatory Sets to measure background knowledge and engage students. Cooperative Learning Strategies.</td>
<td>Tests and quizzes, Cooperative and independent learning experiences, Class work and homework, Closure Questions/ Exit Slips, Performance task, Primary and secondary source activities, Multimedia presentations, Self- assessment, Portfolio assessment, Oral Questions, Do Nows</td>
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**Freehold Regional High School District**
**Math**
**Unit 2: Numerical Operations**

**Enduring Understandings:** Computational fluency includes understanding the meaning and the appropriate use of numerical operations.

**Essential Questions:** What makes a computational strategy both effective and efficient? How do operations affect numbers? How can inquiry and discovery be infused with the power of mathematics? How can connections in mathematics be helpful in the sciences, social sciences and the arts/and to the everyday world? How can students use their ability to reason to conquer a wide array of mathematical problems? How can we use physical models to clarify mathematical relationships? What makes an algebraic algorithm both effective and efficient?

**Unit Goal:**
1. Students will understand how to create and solve matrices.
2. Students will understand how to check the reasonableness of results of computations.
3. Students will understand techniques for solving linear equations systematically.

**Duration of Unit:** 6 weeks

**NJCCCS:** 4:1 B, 4.3 C-D 4.5 A,C,D

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<th>Guiding / Topical Questions</th>
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<th>Teaching Strategies</th>
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<tr>
<td>What strategies can be used to demonstrate the understanding of the four basic arithmetic operations?</td>
<td>Develop the meanings of the four basic arithmetic operations by modeling and discussing a large variety of problems</td>
<td>Lecture Notes</td>
<td>Write equivalent forms of the same number (whole numbers, fractions, percents, decimals).</td>
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<tr>
<td>How can you use strategies to become proficient with basic multiplication and division number facts using a variety of fact strategies?</td>
<td>Demonstrate understanding of the Commutative properties (3x7=7x3)</td>
<td>Transparencies</td>
<td>Perform calculations using ratios, proportions and percents.</td>
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<tr>
<td>How do you construct, use, and explain procedures for performing whole number calculations?</td>
<td>Identify element for multiples of 1 (1x8=8)</td>
<td>Power point presentations</td>
<td>Organize numbers from largest to smallest.</td>
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<tr>
<td>Why is it important to be able to count and perform simple computations with money?</td>
<td>Associative properties</td>
<td>Manipulatives</td>
<td>Use a place value chart to determine a digit’s place value.</td>
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<tr>
<td>How do you determine which computational method to use (pencil-and-paper, mental math, or a calculator)?</td>
<td>Understand that division by zero is undefined</td>
<td>Internet and interactive displays and activities</td>
<td>Use manipulatives, number lines, counters, arrays, to add, subtract, multiply or divide.</td>
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</tr>
<tr>
<td>How do you construct, use, and explain procedures for performing whole number calculations?</td>
<td>Demonstrate understanding that any number multiplied by zero is zero</td>
<td>Use current technology where available</td>
<td>Use computer software; games, school store.</td>
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<tr>
<td>What strategies can be used to demonstrate the understanding of the four basic arithmetic operations?</td>
<td>Identify the symbols (≥, &lt;, &gt;)</td>
<td>Demonstrations</td>
<td>Money skills: identify, count, add, subtract, multiply, divide, make change, sales tax, interest, tip, commission, discount</td>
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<tr>
<td>How do you determine which computational method to use (pencil-and-paper, mental math, or a calculator)?</td>
<td>Evaluate expressions using order of operations</td>
<td>Hands on activities</td>
<td>Create a budget.</td>
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<tr>
<td>How do you determine which computational method to use (pencil-and-paper, mental math, or a calculator)?</td>
<td>Understand and evaluate algebraic expressions Recognize greater than</td>
<td>Educational excursions</td>
<td>Create list comparing needs, wants, and resources.</td>
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<tr>
<td>How do you determine which computational method to use (pencil-and-paper, mental math, or a calculator)?</td>
<td>Solve equations using addition</td>
<td>Graphic organizer</td>
<td>Use store circulars to create shopping lists.</td>
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<th>Textbook Ancillaries</th>
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<td>Math magazines</td>
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**Tests and quizzes**
- Cooperative and independent learning experiences
- Closure Questions/ Exit Slips
- Notebook Checks
- Do Nows
- Performance task
- Primary and secondary source activities
- Multimedia presentations
- Self-assessment
- Portfolio assessment
<table>
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<tr>
<th>Guiding / Topical Questions</th>
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<tr>
<td>that influence gross income and net income?</td>
<td>and subtraction</td>
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<td>background knowledge and engage students</td>
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<tr>
<td>Why is it important to design, implement and critique a personal financial plan?</td>
<td>Develop proficiency with basic multiplication and division number facts using a variety of fact strategies</td>
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<td>Use guided and independent practice activities</td>
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<tr>
<td>How do you perform operations on matrices?</td>
<td>Construct, use, and explain procedures for performing whole number calculations with pencil-and-paper, mental math, calculator</td>
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<td>Paired – Shared Activities</td>
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<tr>
<td>How do you construct open sentences that describe real life?</td>
<td>Use efficient and accurate pencil-and-paper procedures for computation with whole numbers (addition of 3-digit numbers; subtraction of 3-digit numbers; multiplication of 2-digit numbers by 1-digit number)</td>
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<td>Cooperative Learning Strategies</td>
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<td>Count and perform simple computations with money (Money notations)</td>
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<td>Pattern blocks, graphs, and equations to match model</td>
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<td>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>
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<td>Check the reasonableness of results of computations</td>
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<td>How to create and solve matrices</td>
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<td>• Compare and contrast rates, ratios, and percents</td>
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Enduring Understandings: Context is critical when using estimation.

**Essential Question/s for this unit:** How can we decide when to use an exact answer and when to use an estimate? How can an answer be judged reasonable or unreasonable? How can students use their ability to reason to conquer a wide array of mathematical problems? What type of alternate perspectives can be used to present the problem and the solution?

**Unit Goal:**
1. Students will understand how do you recognize when an estimate is appropriate, and understand the usefulness of an estimate as distinct from an exact answer?
2. Students will understand how to use estimation to determine whether the result of a computation is reasonable

**Duration of Unit:** 3 weeks

**NJCCCS:** 4.1 C, 4.5 E-D

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<tr>
<th>Guiding / Topical Questions</th>
<th>Content and Skills</th>
<th>Instructional Resources and Materials</th>
<th>Teaching Strategies</th>
<th>Assessment Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimation</td>
<td>Judge without counting whether a set of objects has less than, more than, or the same number of objects as a reference set.</td>
<td>Lecture, Notes, Transparencies, Power point presentations, Audio visual aids, Manipulatives, Internet and interactive displays and activities, Use current technology where available</td>
<td>Estimating Games, Use direct instruction to introduce new topics, Use guided and independent practice activities, Anticipatory Sets to measure background knowledge and engage students, Paired – Shared Activities</td>
<td>Tests and quizzes, Cooperative and independent learning experiences, Class work and homework, Class discussion and participation, Performance task, Primary and secondary source activities, Multimedia presentations, Self-assessment, Portfolio assessment, Closure Questions/ Exit Slips, Oral Questions</td>
</tr>
<tr>
<td></td>
<td>Construct and use a variety of estimation strategies (e.g., rounding and mental math) for estimating both quantities and the result of computations.</td>
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<td></td>
<td>Recognize when an estimate is appropriate, and understand the usefulness of an estimate as distinct from an exact answer.</td>
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<td></td>
<td>Use estimation to determine whether the result of a computation (either by calculator or by hand) is reasonable.</td>
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<td></td>
<td>Brainstorm times when you would want to estimate.</td>
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</tbody>
</table>
## Enduring Understandings:
Spatial sense and geometric relationships are a means to solve problems and make sense of a variety of phenomena.

- **Essential Questions for this unit:**
  - How can spatial relationships be described by careful use of geometric language? How do geometric relationships help to solve problems and/or make sense of phenomena? Where would you see tessellations in the real world? How is a tessellation created? How can strong communication skills enhance the mathematical experience? How can a student’s new found knowledge be used to help others? How can inquiry and discovery be infused with the power of mathematics?

## Unit Goal:
1. Students will understand geometric symbols, shapes and figures
2. Students will understand how tessellations are generated.

## Duration of Unit: 4 weeks
NJCCCS: 4.2 A-B, 4.5 A,B

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<thead>
<tr>
<th>Guiding / Topical Questions</th>
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</thead>
<tbody>
<tr>
<td>Geometry</td>
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<tr>
<td>How do you identify similar figures?</td>
<td>Trace a mirror or image vertically or horizontally</td>
<td>Lecture, Notes, Transparencies, Power point presentations, Audio visual aids, Manipulatives, Internet and interactive displays and activities, Use current technology where available, Demonstrations, Hands on activities, Educational excursions, Graphic organizer</td>
<td>When given 2 adjacent sides of a rectangle, plug in the remaining information to find the perimeter, Compare/contrast Scalene Triangle and an Equilateral Triangle using spaghetti or licorice as visuals, Use guided and independent practice activities, Anticipatory Sets to measure background knowledge and engage students</td>
<td>Tests and quizzes, Cooperative and independent learning experiences, Class work and homework, Class discussion and participation, Performance task, Primary and secondary source activities, Multimedia presentations, Self- assessment, Portfolio assessment, Projects and other Alternative Assessments, Closure Questions / Exit Slips</td>
</tr>
<tr>
<td>How do you identify and/or create a tessellation?</td>
<td>Identify similarities and differences of angles/lengths of sides of triangles and quadrilaterals, Identify geometric symbols, shapes, and figures, Identify what two dimensional shapes exists when given a three dimensional figure</td>
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</tbody>
</table>
### Enduring Understandings:
Coordinate geometry can be used to represent and verify geometric/algebraic relationships. The functions and relationships concepts are fundamental ideas in mathematics.

### Essential Questions for this unit:
How can we best represent and verify geometric/algebraic relationships? What are the relationships between parallel lines, perpendicular lines and how they are related to the coordinate plane? What type of alternate perspectives can be used to present the problem and the solution?

### Unit Goal:
1. Students will understand how to find the distance between two points.
2. Students will understand how to fit a line to data and make a prediction.

### Duration of Unit: 3 weeks

### State Standards:
4.2, 4.5 E

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Coordinate Geometry</td>
<td>Write and solve proportions through visual groupings.</td>
<td>Lecture</td>
<td>Demonstrate how to reduce fractions using a chart to find common multiples of denominators and numerators.</td>
<td>Tests and quizzes</td>
</tr>
<tr>
<td></td>
<td>Explain how to draw and label a coordinate plane</td>
<td>Notes</td>
<td>Solve proportions.</td>
<td>Cooperative and independent learning experiences</td>
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<tr>
<td></td>
<td>Demonstrate how to plot the points on one coordinate plane</td>
<td>Transparencies</td>
<td>Write and solve proportions through visual groupings.</td>
<td>Class work and homework</td>
</tr>
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<td>Explain how to decide whether an ordered pair is a solution of an equation</td>
<td>Power point presentations</td>
<td>Write and solve proportions from word problems (use recipes to demonstrate</td>
<td>Class discussion and participation</td>
</tr>
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<td>Write and solve proportions through visual groupings.</td>
<td>Audio visual aids</td>
<td>Use direct instruction to introduce new topics</td>
<td>Performance task</td>
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<td></td>
<td>Use current technology where available</td>
<td>Manipulatives</td>
<td>Use guided and independent practice activities</td>
<td>Primary and secondary source activities</td>
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<tr>
<td></td>
<td>Demonstrations</td>
<td>Internet and interactive displays and activities</td>
<td>Anticipatory Sets to measure background knowledge and engage students.</td>
<td>Multimedia presentations</td>
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<td>Hands on activities</td>
<td>Use current technology where available</td>
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<td>Self-assessment</td>
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<td>Educational excursions</td>
<td>Demonstrations</td>
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<td>Portfolio assessment</td>
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<td></td>
<td>Graphic organizer</td>
<td>Hands on activities</td>
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<td>Closure Activities/ Exit Slips</td>
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<td>Educational excursions</td>
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<td>Oral Quizzes</td>
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</tbody>
</table>
### Enduring Understandings:
Measurement is a tool to quantify a variety of phenomena. Measurement can be used to solve everyday problems through the use of different measuring tools.

### Essential Questions for this unit:
- How can measurements be used to solve problems?
- Why is it necessary to use the appropriate tools (protractor, compass and tape measurement) to measure various Geometric shapes?
- How can an answer be judged reasonable or unreasonable?
- How can strong communication skills enhance the mathematical experience?
- How can inquiry and discovery be infused with the power of mathematics?

### Unit Goal:
Students will understand how to select and use the standard units of measure and measurement tools.

Students will understand how to measure and calculate the area, perimeter, circumference of geometric figures.

### Duration of Unit: 4 weeks
NJCCCS: 4.2 D-E, 4.5 A-B

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</table>
| Units of Measurement        | • Write time in standard notation  
• Calculate elapsed time  
• Write the date with words and numbers  
• List the months of the year in order  
• Locate the date on a calendar  
• Measure and calculate the area, perimeter, circumference of geometric figures  
• Find the surface area and volume of geometric figures  
• Solve problems using elapsed time  
• Convert measurements within a system  
• How to make conversions within a measurement system.  
• The relationship between perimeter and area  
• Relationship between area, surface area and volume. | • Lecture  
• Notes  
• Transparencies  
• Power point presentations  
• Audio visual aids  
• Manipulatives  
• Internet and interactive displays and activities  
• Use current technology where available  
• Demonstrations  
• Hands on activities  
• Educational excursions  
• Graphic organizer  
• Magazines | • Use tools for measuring time: stop watch, clock, calendar.  
• Use appropriate standard measurement tools (rulers, clock, calendar, thermometer, balance, scale, measuring cup)  
• Select and use appropriate standard units of measure (inch, meter, mile, square inch, cubic inch, cup, hours, minutes, grams, degrees Fahrenheit)  
• Create a tessellation Anticipatory Sets to measure background knowledge and engage students  
• Use direct instruction to introduce new topics  
• Use guided and independent practice activities | • Tests and quizzes  
• Cooperative and independent learning experiences  
• Class work and homework  
• Class discussion and participation  
• Performance task  
• Primary and secondary source activities  
• Multimedia presentations  
• Self-assessment  
• Portfolio assessment  
• Closure Questions / Exit Slips |
Freehold Regional High School District  
Math  
Unit 7: Patterns, Functions and Relationships in Algebra

**Enduring Understandings:** Algebra provides language through which we communicate the patterns in mathematics. Patterns, functions and relationships can be represented graphically, numerically, symbolically, or verbally. Real world situations can be modeled by graphs and equations.

**Essential Questions for this unit:** How can change be best represented mathematically? How can patterns, relations, and functions be used as tools to best describe and help explain real-life situations? How are patterns of change related to the behavior of functions? How can strong communication skills enhance the mathematical experience? What makes a computational strategy both effective and efficient? How does pattern recognition enable prediction? How can the use of technology enhance the learning environment?

**Unit Goal:** Students will understand how to interpret patterns in real life situations.  
Students will understand how to evaluate expressions using order of operations.  
Students will use concrete and pictorial models to explore the basic concept of a function.

**Duration of Unit:** 3 weeks  
**NJCCCS:** 4.3 A-B, 4.5 A-F

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</table>
| **Patterns and Algebra**    | • Expressions and equations are related using an equal sign.  
  • Apply the standard order of operations  
  • Recognize, describe, extend and create pattern to recognize and describe change over time  
  • Interpret patterns in real life situations  
  • Evaluate expressions using order of operations  
  • Represent a function in a variety of ways  
  • Reading graphs, understanding graphs  
  • Use graphing calculators to create a graph | • Lecture  
  • Notes  
  • Transparencies  
  • Power point presentations  
  • Audio visual aids  
  • Manipulatives  
  • Internet and interactive displays and activities  
  • Use current technology where available  
  • Demonstrations  
  • Hands on activities  
  • Educational excursions  
  • Graphic organizer  
  • Graphing calculators  
  • Magazines | • Understand and evaluate algebraic expressions  
  • Draw a pattern and try to figure out what has changed from one figure to the next  
  • Student created patterns using a variety of manipulatives  
  • Describe the pattern  
  • Convert a visual pattern to a numerical pattern  
  • Use a table to organize thinking  
  • Student created graphs  
  • Comparison Shopping Activities  
  • Use guided and independent practice activities | • Tests and quizzes  
  • Cooperative and independent learning experiences  
  • Class work and homework  
  • Class discussion and participation  
  • Performance task  
  • Primary and secondary source activities  
  • Multimedia presentations  
  • Self- assessment  
  • Portfolio assessment  
  • Closure Questions/ Exit Slips  
  • Notebook Checks  
  • Anticipatory Sets |
**Freehold Regional High School District**  
**Math**  
**Unit 8: Data Analysis**

**Enduring Understandings:** Reading, Understanding, interpreting, and communicating data are critical in modeling a variety of real-world situations, drawing appropriate inferences, making informed decisions, and justifying those decisions.

1. Students will understand how to evaluate data for accuracy and reasonableness of conclusions drawn.
2. Students will understand how to use sampling techniques to generate data and draw conclusions about large groups.

**Essential Questions:** How can the collection, organization, interpretation, and display of data be used to answer questions? How can we use mathematical models to describe physical relationships? How can we use physical models to clarify mathematical relationships? What makes an algebraic algorithm both effective and efficient? How can inquiry and discovery be infused with the power of mathematics? How can students use their ability to reason to conquer a wide array of mathematical problems? When would you use a chart or graph to display pertinent information? How can the use of technology enhance the learning environment?

**Unit Goal:** Students will understand how to evaluate data for accuracy and reasonableness of conclusions drawn.

Students will understand how to use sampling techniques to generate data and draw conclusions about large groups.

**Duration of Unit:** 3 weeks

**NJCCCS:** 4.3 C – D, 4.4 A, 4.5 A-F

<table>
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<tr>
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<tr>
<td>Data Analysis</td>
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</tbody>
</table>
| • How can data be organized, displayed, and interpreted? | • Collect data from school, classroom, environment to create charts  
• Put gathered data in order  
• Analyze and interpret data.  
• Count sequentially  
• Generate data from chance devices, such as spinners and dice  
• Represent data using pictures, tally charts, pictograph, bar graph, Venn diagram | • Lecture  
• Notes  
• Transparencies  
• Power point presentations  
• Audio visual aids  
• Manipulatives  
• Internet and interactive displays and activities  
• Use current technology where available  
• Demonstrations  
• Hands on activities  
• Educational excursions  
• Graphic organizer  
• Graphing calculators | • Use M&M, candy bars, licorice to teach total, fraction, decimal, percent  
• Pie charts  
• Arrange groups of objects in various orders  
• Arrange coins in progressive order  
• Conduct a survey  
• Student generated graphs  
• Cooperative groups to analyze data | • Tests and quizzes  
• Cooperative and independent learning experiences  
• Class work and homework  
• Class discussion and participation  
• Performance task  
• Primary and secondary source activities  
• Multimedia presentations  
• Self-assessment  
• Portfolio assessment |
Freehold Regional High School District
Math
Unit 9: Probability

**Enduring Understandings:** Probability quantifies the likelihood that something will happen and enables us to make predictions and informed decisions.

**Essential Questions for this unit:** How can experimental and theoretical probabilities be used to make predictions or draw conclusions? How can attributes be used to classify data/objects? How can probability be used to make predictions and/or conclusions? How can connections in mathematics be helpful in the sciences, social sciences and the arts; and to the everyday world? How can the use of technology enhance the learning environment?

**Unit Goal:** Students will understand how to calculate the probability of two events that occur simultaneously.

Students will understand how to use chance devices to explore concepts of probability.

**Duration of Unit:** 3 weeks

**NJCCCS:** 4.4 B/4.5 A-F

<table>
<thead>
<tr>
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<th>Content and Skills</th>
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<th>Teaching Strategies</th>
<th>Assessment Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>• What events are predictable?</td>
<td>Students will know, be able to, or understand...</td>
<td>• Lecture&lt;br&gt;• Notes&lt;br&gt;• Transparencies&lt;br&gt;• Power point presentations&lt;br&gt;• Audio visual aids&lt;br&gt;• Manipulatives&lt;br&gt;• Internet and interactive displays and activities&lt;br&gt;• Use current technology where available&lt;br&gt;• Demonstrations&lt;br&gt;• Hands on activities&lt;br&gt;• Educational excursions&lt;br&gt;• Graphic organizer&lt;br&gt;• Graphing calculators</td>
<td>• Use coin flipping or card playing to show experimental vs. theoretical&lt;br&gt;• Probability of getting specific outcome when coin is tossed, die rolled, spinner is spun: create a table to show results</td>
<td>• Tests and quizzes&lt;br&gt;• Cooperative and independent learning experiences&lt;br&gt;• Class work and homework&lt;br&gt;• Class discussion and participation&lt;br&gt;• Performance task&lt;br&gt;• Primary and secondary source activities&lt;br&gt;• Multimedia presentations&lt;br&gt;• Self-assessment&lt;br&gt;• Portfolio assessment</td>
</tr>
<tr>
<td>• How do you record accurate information based on possible outcomes?</td>
<td>Use chance devices to explore concepts of probability&lt;br&gt;Provide probability of specific outcomes&lt;br&gt;Find probability of two events that are mutually exclusive&lt;br&gt;Find the probability of two events that occur simultaneously&lt;br&gt;Calculate the probability of events&lt;br&gt;Use Pascal’s Triangle to count the number of ways an event can happen</td>
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<td>• How do you distinguish between experimental and theoretical probability?</td>
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<tr>
<td>• How can we use the counting principle in probability?</td>
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</table>
Enduring Understandings: Consists of tools and strategies for representing, organizing, and interpreting non-continuous data.

Essential Questions for this unit: How can attributes be used to classify data/objects? What is the best way to solve this? What counting strategy works best here? How can visual tools such as networks (vertex-edge graphs) be used to answer questions? How can algorithmic thinking be used to solve problems?

Unit Goal: Students will understand how to investigate ways to represent and classify data according to attributes.

Duration of Unit: 2 weeks

NJCCCS: 4.4 C - D

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<tbody>
<tr>
<td>How do you sort and classify objects according to attributes?</td>
<td>Explore a variety of puzzles, games, and counting problems</td>
<td>Lecture</td>
<td>Matching games</td>
<td>Tests and quizzes</td>
</tr>
<tr>
<td>How do you generate all possibilities in simple counting situations?</td>
<td>Investigate ways to represent and classify data according to attributes, such as color or shape, and relationships</td>
<td>Notes</td>
<td>Memory games</td>
<td>Cooperative and independent learning experiences</td>
</tr>
<tr>
<td>How do you follow simple sets of directions? How do you explore concrete models of vertex-edge graphs to create paths from one vertex to another?</td>
<td>Discuss the purpose and usefulness of such classification</td>
<td>Transparencies</td>
<td>Sorting activities</td>
<td>Class work and homework</td>
</tr>
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<td>Use networks and tree diagrams to represent everyday situations</td>
<td>Power point presentations</td>
<td>Using attribute blocks or objects with clearly defined attributes, students develop a sequence of objects where each differs from the previous one in only one attribute.</td>
<td>Class discussion and participation</td>
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<tr>
<td></td>
<td>Explore a variety of puzzles, games, and counting problems</td>
<td>Internet and interactive displays and activities</td>
<td>Students use two Hula Hoops to assist in sorting attribute blocks or other objects according to two characteristics.</td>
<td>Performance task</td>
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<td>Use current technology where available</td>
<td>Use Venn diagrams to organize the similarities and differences between the information in two stories</td>
<td>Primary and secondary source activities</td>
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<td>Demonstrations</td>
<td>Students bring in names of cities and their zip codes where their relative and friends live, paste these at the appropriate locations on a map of the US, and look for patterns which might explain</td>
<td>Multimedia presentations</td>
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<td>Hands on activities</td>
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<td>Self- assessment</td>
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<td>Educational excursions</td>
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<td>Portfolio assessment</td>
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<td>Graphic organizer</td>
<td></td>
<td>Oral assessments</td>
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<td>Graphing calculators</td>
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how zip codes are assigned. Compare results with post office information to see whether they are consistent with the way they are actually assigned.

- Students collect information about a particular drink that they like and discuss various ways of presenting the resulting information, using tables, bar graphs, pie charts.
- Students determine the number of different ways any three people can be arranged in order, and use a tree diagram to organize the information.
- Students follow a recipe to make a cake, and then write their own versions of those instructions.
- Students write step by step instructions for a simple task and follow them to prove that they work.
- Students play games like *dots and blocks* and systematically think about the moves they make in the game.
- Students use a floor plan of their school to map out alternate routes from their classroom to the school’s exits, and discuss whether the fire drill route is in fact the shortest route to an exit.