Course Description

Algebra II
ALGEBRA II

Course Rationale:
Mathematics provides the conceptual basis for the structure of many things around us. This course is an extension of the Algebra 1 curriculum. Topics that were first introduced in Algebra 1 will be built upon and applied to problems that require higher order thinking skills. Additional topics will also be introduced in a variety of methods, including self-discovery activities, group project and presentations, and teacher led class discussions. Algebra 2 builds a foundation of mathematics for those students going on to Pre-Calculus and/or students who are college bound. Along with many colleges, a majority of careers require a successful completion of an Algebra 2 course.

Course Description:
Fundamental skills of mathematics will be applied to such topics as functions, equations and inequalities, probability and statistics, logarithmic and exponential relationships, quadratic and polynomial equations, and matrices. Technology will be used to introduce and expand upon the areas of study listed above. Use of computers and graphing calculators will be incorporated into each chapter.
Resources:
Adopted Text: 

Websites:
www.analyzemath.com
http://argyll.epsb.ca
www.dese.mo.gov/

Classroom Assessment Item Bank
www.edhelper.com
www.edhelper.com
http://en.wikipedia.org
http://explorelearning.com
www.gomath.com
http://illuminations.nctm.org
www.math.csusb.edu
www.math.com
www.math.odu.edu
http://mathforum.org/mathtools/sitemap.html
www.mathgoodies.com
www.mste.uiuc.edu
http://nlym.usu.edu
http://polymer.bu.edu
www.regentprep.org/
www.shodor.org/interactivate
www.stat.stanford.edu
www.stattrek.com
www.successlink.org
www.teacherlink.org

Abbreviations:

<table>
<thead>
<tr>
<th>Subjects</th>
<th>CLE</th>
<th>Course Level Expectations</th>
<th>BT</th>
<th>Bloom’s Taxonomy</th>
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<tbody>
<tr>
<td>CA</td>
<td></td>
<td>Math Strands</td>
<td>K</td>
<td>Knowledge</td>
</tr>
<tr>
<td>MA</td>
<td>NO</td>
<td>Number and Operations</td>
<td>C</td>
<td>Comprehension</td>
</tr>
<tr>
<td>SC</td>
<td>AR</td>
<td>Algebraic Relationships</td>
<td>Ap</td>
<td>Application</td>
</tr>
<tr>
<td>SS</td>
<td>GSR</td>
<td>Geometric Spatial Relationships</td>
<td>An</td>
<td>Analysis</td>
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<td></td>
<td>M</td>
<td>Measurements</td>
<td>S</td>
<td>Synthesis</td>
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<td></td>
<td>DP</td>
<td>Data and Probability</td>
<td>E</td>
<td>Evaluation</td>
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</tbody>
</table>
### Algebra II

**Number and Operations**

1. Understand numbers, ways of representing numbers, relationships among numbers and number systems.

<table>
<thead>
<tr>
<th>Measurable Learner Objective</th>
<th>Assessed Show-Me Goals</th>
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<th>Assessments (including Performance-based)</th>
<th>Mastery Min. %</th>
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</thead>
<tbody>
<tr>
<td>Represent and use rational numbers</td>
<td>MA 1 3.4</td>
<td>NO 1.B.</td>
<td>An</td>
<td>&gt;The students will work together to use real numbers to solve problems involving house painting <a href="http://www.regentprep.org/">www.regentprep.org/</a> MAP A #3 Operations Applications of Mathematics Lessons for Applied Mathematics <strong>Paint by Numbers</strong></td>
<td>Students will solve problems using real numbers. Attachment A</td>
<td>80%</td>
</tr>
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**Integrated Skills: Workplace Readiness**
## Number and Operations

1. Understand numbers, ways of representing numbers, relationships among numbers and number systems.

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<tbody>
<tr>
<td>Compose and decompose numbers</td>
<td>MA 5 3.6</td>
<td>NO 1.C</td>
<td>Ap</td>
<td>&gt; The students will use a variety of representations to demonstrate an understanding of numbers when completing Magic Squares designed for high school level. <a href="http://mathforum.org/alejandre/magic.square.html">http://mathforum.org/alejandre/magic.square.html</a></td>
<td>Students will use a variety of representations to demonstrate an understanding of very large and very small numbers when completing a textbook assignment.</td>
<td>75%</td>
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</tbody>
</table>

Integrated Skills: Workplace Readiness
## Number and Operations

### 2. Understand meanings of operations and how they relate to one another

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</thead>
<tbody>
<tr>
<td>Apply properties of operations</td>
<td>MA 4 1.6 1.10</td>
<td>NO 2.C.</td>
<td>An</td>
<td>The students will apply properties of exponents when completing on-line activity and quiz at the following website. <a href="http://explorelearning.com/index.cfm?method=cResource.dspView&amp;ResourceId=305">http://explorelearning.com/index.cfm?method=cResource.dspView&amp;ResourceId=305</a></td>
<td>Students will apply properties of exponents to simplify expressions or solve equations on a worksheet. <a href="http://www.edhelper.com/algebra.htm#AT4">http://www.edhelper.com/algebra.htm#AT4</a> Evaluate Exponents Adding Exponents And/or a constructed response question. Attachment B</td>
<td>80%</td>
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</tbody>
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- Apply **properties of exponents** to simplify expressions or solve equations

**Integrated Skills: Workplace Readiness**
## Number and Operations

### 2. Understand meanings of operations and how they relate to one another

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<tr>
<td>The student will be able to:</td>
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</table>
| **Apply operations on real and complex numbers** | MA 1 MA 4 MA 5 1.4 3.4 | NO 2.D. | Ap | >The students will apply operations to real numbers when working with bar codes and check digits in the lesson “Check That Digit” [http://illuminations.nctm.org](http://illuminations.nctm.org) Lessons, grades 9-12  
>The students will apply operations when completing the SuccessLink lesson “Compound Interest Project” [www.successlink.org](http://www.successlink.org) | Students will apply operations to real numbers, using mental computation or paper-and-pencil calculations for simple cases and technology for more complicated cases when completing a variety of quizzes. [www.regentprep.org/](http://www.regentprep.org/) MAP A #3 Operations  
Choose area to be taught and tested  
And/or a performance event [www.dese.gov](http://www.dese.gov) Classroom Assessment Item Bank All Wrapped Up | 80% |

Integrated Skills: Workplace Readiness
### Number and Operations

#### 2. Understand meanings of operations and how they relate to one another

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</thead>
</table>
| **Apply operations on real and complex numbers** | MA 1  
MA 4  
MA 5  
1.4  
3.4 | NO 2.D. | Ap | >The students will apply operations to matrices when completing the on-line explanation and activities located at: [http://www.math.csusb.edu/math110/src/matrices/basics.html](http://www.math.csusb.edu/math110/src/matrices/basics.html)  
AND AT: [http://www.math.odu.edu/~bogacki/cgi-bin/lat.cgi](http://www.math.odu.edu/~bogacki/cgi-bin/lat.cgi) | Students will apply operations to matrices and complex numbers, using mental computation or paper-and pencil calculations for simple cases and technology for more complicated cases with a textbook assignment. | 75% |

**Integrated Skills: Workplace Readiness, Technology**
### Number and Operations

**3. Compute fluently and make reasonable estimates.**

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<tr>
<td><strong>Estimate and justify solutions</strong></td>
<td>MA 1 3.8</td>
<td>NO 3.D.</td>
<td>E</td>
<td>&gt;The students will judge the reasonableness of computations by completing a variety of lessons. <a href="http://www.math.com/students/practice.html">http://www.math.com/students/practice.html</a> Teacher can choose from many types of lessons, activities and quizzes</td>
<td>Students will judge the reasonableness of numerical computations and their results on a textbook test.</td>
<td>80%</td>
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</table>

**Integrated Skills: Workplace Readiness**
**Number and Operations**

3. Compute fluently and make reasonable estimates.

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<tr>
<td>The student will be able to:</td>
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<td></td>
<td>The students will solve problems involving proportions using a step-by-step direction and variety of problems. Attachment C &gt;In groups of 3 students will create proportion word problems. They will exchange their problems with another group and then check for accuracy.</td>
<td>Students will solve problems involving proportions on a textbook test.</td>
<td>75%</td>
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**Integrated Skills: Workplace Readiness**
## Algebraic Relationships

1. **Understand patterns, relations and functions**

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<tbody>
<tr>
<td>The student will be able to:</td>
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<td></td>
<td>Students will generalize patterns using explicitly or recursively defined functions with a worksheet</td>
<td>80%</td>
</tr>
<tr>
<td>Create and analyze patterns</td>
<td>MA 4 1.6 3.5</td>
<td>AR 1.B</td>
<td>C</td>
<td>The students will generalize patterns using recursively defined functions when investigating the cost of DVD rentals, <a href="http://illuminations.nctm.org">http://illuminations.nctm.org</a> Lessons, grades 9-12 Movie Lines</td>
<td>Attachment D and E</td>
<td></td>
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<tr>
<td>• Generalize patterns using explicitly or recursively defined functions</td>
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**Integrated Skills: Workplace Readiness**
## Algebraic Relationships

1. **Understand patterns, relations and functions**

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</tr>
<tr>
<td>Classify objects and representations</td>
<td>MA 4 1.6</td>
<td>AR 1.C</td>
<td>A</td>
<td>The students will compare and contrast various forms of patterns when completing the lesson “Building Connections” <a href="http://illuminations.nctm.org">http://illuminations.nctm.org</a> Lessons, grades 9-12</td>
<td>Students will compare and contrast various forms of representations of patterns when completing the activity and/or classroom assignment</td>
<td>80%</td>
</tr>
</tbody>
</table>

**Integrated Skills: Workplace Readiness**
Algebraic Relationships

1. Understand patterns, relations and functions

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<tbody>
<tr>
<td>Identify and compare functions</td>
<td>MA 4 1.6 3.6</td>
<td>AR 1.D</td>
<td>A</td>
<td>The students will understand and compare the properties of linear, exponential and quadratic functions when completing the lesson “Light It Up” <a href="http://illuminations.nctm.org">http://illuminations.nctm.org</a> Lessons, Grades 9-12</td>
<td>Students will evaluate the properties of linear, exponential and quadratic functions on a textbook assignment or a worksheet. Attachment F</td>
<td>75%</td>
</tr>
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</table>

Integrated Skills: Technology
### Algebraic Relationships

1. **Understand patterns, relations and functions**

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<tbody>
<tr>
<td>The student will be able to:</td>
<td>MA 4 1.6 4.1</td>
<td>AR 1.E.</td>
<td>C</td>
<td>In groups of 2, students will create functions where the variable a stays the same and b and c change. The groups will switch their problems with another group for them to describe the changes in the graph and then will evaluate their answers.</td>
<td>Students will describe the effects of parameter changes on quadratic and exponential functions when completing a constructed response question.</td>
<td>80%</td>
</tr>
</tbody>
</table>

**Integrated Skills: Workplace Readiness**
### Algebraic Relationships

#### 2. Represent and analyze mathematical situations and structures using algebraic symbols.

<table>
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<tr>
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<tbody>
<tr>
<td>The student will be able to:</td>
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<td></td>
<td>The students will use symbolic algebra to represent and solve problems when completing the on-line activities located at the following website: <a href="http://www.analyzemath.com/precalculus.html">http://www.analyzemath.com/precalculus.html</a></td>
<td>Students will solve problems that involve quadratic relationships including recursive relationships with a performance event assessment.</td>
<td>80%</td>
</tr>
<tr>
<td>Represent mathematical situations</td>
<td>MA 4</td>
<td>AR</td>
<td>S</td>
<td>&gt;In groups, the students will use symbolic algebra to represent and solve problems when completing the SuccessLink lesson “Linear Programming Project” <a href="http://www.successlink.org">www.successlink.org</a></td>
<td>Attachment G And/or a worksheet Attachment H</td>
<td></td>
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<tr>
<td></td>
<td>MA 6 1.6 3.1</td>
<td>2.A.</td>
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**Integrated Skills: Workplace Readiness**
## Algebraic Relationships

### 2. Represent and analyze mathematical situations and structures using algebraic symbols.

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<tr>
<td>Describe and use mathematical manipulation</td>
<td>MA 4 3.1 4.1</td>
<td>AR 2.B.</td>
<td>C Ap</td>
<td>&gt;The students will describe and use algebraic factoring when using factoring tiles. (tutorial and problems at the following website: <a href="http://mathforum.org/alejandre/algfac1.html">http://mathforum.org/alejandre/algfac1.html</a>) Attachment I &gt;The students will describe and use algebraic factoring when using on-line factoring tiles. <a href="http://argyll.epsb.ca/jreed/math9/strand2/2210.htm">http://argyll.epsb.ca/jreed/math9/strand2/2210.htm</a> &gt;The students will describe and use algebraic factoring in a BINGO game. <a href="http://www.successlink.org">www.successlink.org</a> Factor BINGO</td>
<td>Students will describe and use algebraic manipulations, including factoring and rules of integer exponents with a textbook assignment and/or on-line assessment. <a href="http://argyll.epsb.ca/jreed/math9/strand1/1107.htm">http://argyll.epsb.ca/jreed/math9/strand1/1107.htm</a> and/or a worksheet Attachment J</td>
<td>75%</td>
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### Integrated Skills:
## Algebraic Relationships

2. Represent and analyze mathematical situations and structures using algebraic symbols.

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| Utilize equivalent forms     | MA 4 1.6 3.4           | AR 2.C   | Ap | The students will use and solve equivalent forms of equations and inequalities when completing a performance event activity. Attachment K  
> The students will use and solve equivalent forms of equations and inequalities when completing a performance event activity. Attachment L | Students will solve equivalent forms of equations and inequalities with a worksheet. http://www.edhelper.com/algebra.htm and/or Attachment M | 80% |

**Integrated Skills: Workplace Readiness**
### Algebraic Relationships

2. Represent and analyze mathematical situations and structures using algebraic symbols.

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<tbody>
<tr>
<td>Utilize systems</td>
<td>MA 4 1.6 AR 2.D.</td>
<td>A</td>
<td></td>
<td>The students will use and solve systems of linear equations or inequalities when completing the lesson&lt;br&gt;&lt;br&gt;&lt;span style=&quot;color: green&quot;&gt;Dirt Bike Dilemma&lt;/span&gt;&lt;br&gt;&lt;br&gt;<a href="http://illuminations.nctm.org">http://illuminations.nctm.org</a> Lessons, Grades 9-12&lt;br&gt;&lt;br&gt;Additional worksheets&lt;br&gt;&lt;br&gt;<a href="http://www.edhelper.com/algebra.htm">http://www.edhelper.com/algebra.htm</a>&lt;br&gt;&lt;br&gt;&gt;The students will use and solve systems of linear equations or inequalities when completing the on-line lessons, activities and assessment.&lt;br&gt;&lt;br&gt;www.regentprep.org/ MAP A&lt;br&gt;&lt;br&gt;#7 Patterns &amp; Functions&lt;br&gt;&lt;br&gt;Solve Systems of Linear Equations&lt;br&gt;Solve Systems of Inequalities</td>
<td>Students will solve systems of linear equations or inequalities with 2 variables on a performance event activity&lt;br&gt;&lt;br&gt;Attachment N&lt;br&gt;&lt;br&gt;And/or a worksheet&lt;br&gt;&lt;br&gt;Attachment O</td>
<td>80%</td>
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### Integrated Skills:
## Algebraic Relationships

### 3. Use mathematical models to represent and understand quantitative relationships.

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<tr>
<td>Use mathematical models</td>
<td>MA 4 1.6 3.6</td>
<td>AR 3.A.</td>
<td>K C</td>
<td>The teacher will provide sample graphs for the students to identify and determine the type(s) of functions that they model. &lt;br&gt;Attachment P &lt;br&gt;&lt;br&gt; &gt;The students will identify quantitative relationships and determine the type(s) of functions that model a situation when completing the lesson <strong>Hanging Chains</strong> located at the following website: &lt;br&gt;<a href="http://illuminations.nctm.org">http://illuminations.nctm.org</a> Lessons, Grades 9-12</td>
<td>Students will identify quantitative and determine the type(s) of functions that might model the situation to solve the problem on a textbook assignment or a worksheet. Attachment Q</td>
<td>80%</td>
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**Integrated Skills: Technology, Workplace Readiness**
## Algebraic Relationships

### Analyze change in various contexts.

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<tr>
<td>The student will be able to:</td>
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<td></td>
<td>The students will analyze and investigate rates of change, intercepts and zeros when completing the SuccessLink lesson “Free Standing Structures” <a href="http://www.successlink.org">www.successlink.org</a></td>
<td>Students will analyze quadratic functions by investigating rates of change, intercepts and zeros on a textbook assignment or a worksheet. Attachment R</td>
<td>80%</td>
</tr>
<tr>
<td>Analyze change</td>
<td></td>
<td>AR 4.1</td>
<td>A</td>
<td>&gt;The students will analyze and investigate changes when completing the SuccessLink lesson “Flying Rings” <a href="http://www.successlink.org">www.successlink.org</a></td>
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<td></td>
<td>MA 4 1.6</td>
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**Integrated Skills: Technology**
## Geometric and Spatial Relationships

### 3. Apply transformations and use symmetry to analyze mathematical situations

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</tr>
<tr>
<td>Use transformations on objects</td>
<td>MA 2 1.10</td>
<td>GSR 3.A.11</td>
<td>Ap</td>
<td>&gt;The students will use and apply matrices to represent transformations when reviewing transformation matrices at the following website: <a href="http://en.wikipedia.org/wiki/Transformation_matrix">http://en.wikipedia.org/wiki/Transformation_matrix</a></td>
<td>Students will use and apply matrices to represent translations, reflections, rotations, and dilations when a textbook assignment.</td>
<td>80%</td>
</tr>
</tbody>
</table>

**Integrated Skills:**
### Geometric and Spatial Relationships

#### 3. Apply transformations and use symmetry to analyze mathematical situations

<table>
<thead>
<tr>
<th>Measurable Learner Objective</th>
<th>Assessed Show-Me Goals</th>
<th>CLE Code</th>
<th>BT</th>
<th>Instructional Strategies/Student Activities/Resources</th>
<th>Assessments (including Performance-based)</th>
<th>Mastery Min. %</th>
</tr>
</thead>
<tbody>
<tr>
<td>The student will be able to:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Students will translate, dilate and reflect quadratic and exponential functions on a textbook assignment.</td>
<td>80%</td>
</tr>
<tr>
<td>Use transformations on functions</td>
<td>MA 4 3.1</td>
<td>GSR 3.B</td>
<td>Ap</td>
<td>&gt;The students will use an on-line interactive tool to practice with transformations of quadratic and exponential functions. <a href="http://www.analyzemath.com/precalculus.html">http://www.analyzemath.com/precalculus.html</a> Graph Transformations &gt;The students will use transformations when exploring quadratic functions using the T1-83 calculator <a href="http://www.education.ti.com">www.education.ti.com</a> Activities Exchange Math Exploring Quadratic Data</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Integrated Skills: Technology**
## Geometric and Spatial Relationships

4. Use visualization, spatial reasoning and geometric modeling to solve problems.

<table>
<thead>
<tr>
<th>Measurable Learner Objective</th>
<th>Assessed Show-Me Goals</th>
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<th>BT</th>
<th>Instructional Strategies/Student Activities/Resources</th>
<th>Assessments (including Performance-based)</th>
<th>Mastery Min. %</th>
</tr>
</thead>
<tbody>
<tr>
<td>The student will be able to:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Students will draw or use visual models to represent and solve problems when completing the performance task “Going to the Dogs” Models will then be presented to the class.</td>
<td>75%</td>
</tr>
<tr>
<td>Draw and use visual models</td>
<td>MA 2 3.1 2.B.</td>
<td>GSR</td>
<td>Ap</td>
<td>The students will draw and use visual models to represent and solve a problem when completing the SuccessLink lesson “Architecture” <a href="http://www.successlink.org">www.successlink.org</a></td>
<td><a href="http://www.successlink.org">www.successlink.org</a></td>
<td></td>
</tr>
<tr>
<td>• Draw or use <strong>visual models</strong> to represent and solve problems</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

Integrated Skills: Technology
2. Apply appropriate techniques, tools and formulas to determine measurements.

<table>
<thead>
<tr>
<th>Measurable Learner Objective</th>
<th>Assessed Show-Me Goals</th>
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<th>Assessments (including Performance-based)</th>
<th>Mastery Min. %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analyze precision</td>
<td>MA 2 1.7 3.8</td>
<td>M 2.D.</td>
<td>A</td>
<td>&gt;The students will analyze effect of computation on precision when completing the unit “Circle Packing” located at the following website: <a href="http://illuminations.nctm.org">http://illuminations.nctm.org</a> Lessons, Grades 9-12</td>
<td>. Students will analyze effects of computation on precision when completing the performance event activity “A Packer’s Nightmare.” <a href="http://www.dese.mo.gov">www.dese.mo.gov</a> Classroom Assessment Item Bank</td>
<td>80%</td>
</tr>
</tbody>
</table>

Integrated Skills: Technology
### Data and Probability

1. **Formulate questions that can be addressed with data and collect, organize and display relevant data to answer them.**

<table>
<thead>
<tr>
<th>Measurable Learner Objective</th>
<th>Assessed Show-Me Goals</th>
<th>CLE Code</th>
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<th>Assessments (including Performance-based)</th>
<th>Mastery Min. %</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Formulate questions</strong></td>
<td>MA 3 1.2</td>
<td>DP 1.A.</td>
<td>Ap</td>
<td>The students will formulate questions, design studies and collect data about a characteristic when completing the SuccessLink lesson <em>Statistics Survey Unit</em> <a href="http://www.successlink.org">www.successlink.org</a> <a href="http://www.successlink.org">www.successlink.org</a> &gt; Probability and Statistic lessons and Tutorial <a href="http://www.stattrek.com/">http://www.stattrek.com/</a></td>
<td>The students will formulate questions, design studies and collect data about a characteristic on the completion of the classroom activity. Students will share findings in an oral presentation.</td>
<td>80%</td>
</tr>
</tbody>
</table>

**Integrated Skills:**
## Data and Probability

1. Formulate questions that can be addressed with data and collect, organize and display relevant data to answer them.

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<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>The student will be able to:</td>
<td></td>
<td></td>
<td>Ap</td>
<td>The students will select, create and use the appropriate graph for a function. <a href="http://www.successlink.org">www.successlink.org</a> <strong>Families of Graphs</strong></td>
<td>Students will select, create and use appropriate graphical representation of data on a performance-based assessment. <a href="http://www.dese.gov">www.dese.gov</a> <strong>Classroom Assessment Item Bank</strong> <strong>Interpreting Information</strong> And/or <strong>Shipping Charges</strong></td>
<td>80%</td>
</tr>
<tr>
<td>Represent and interpret data</td>
<td>MA 3</td>
<td>DP 1.C.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3.6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select, create and use appropriate graphical representation of data</td>
<td></td>
<td></td>
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<td></td>
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<td></td>
</tr>
</tbody>
</table>

**Integrated Skills: Technology**
## Data and Probability

### 2. Select and use appropriate statistical methods to analyze data

<table>
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<tr>
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</tr>
</thead>
</table>
| **Describe and analyze data** | MA 3 1.10 3.4 | DP 2A | Ap | >The students will apply statistical concepts to solve the statistical problem of coin flipping with an on-line activity. [http://polymer.bu.edu/java/java/winning/WinningStreak.html](http://polymer.bu.edu/java/java/winning/WinningStreak.html)  
The students will apply statistical concepts to solve problems when completing the unit “Cardiac Output, Rates of Change and Accumulation” located at the following website: [http://illuminations.nctm.org](http://illuminations.nctm.org) Lessons, Grades 9-12  
Students will apply statistical concepts to solve problems and distinguish between a statistic and a parameter when completing the performance activity “The World Series Problem” [http://www.mste.uiuc.edu/hill/ev/seriesprob.html](http://www.mste.uiuc.edu/hill/ev/seriesprob.html)  
and/or  
T1-83 activity “Birthday Paradox” located at: [http://illuminations.nctm.org](http://illuminations.nctm.org) Lessons, Grades 9-12 | 80% |

**Integrated Skills: Technology**
### Data and Probability

#### 2. Select and use appropriate statistical methods to analyze data

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</tr>
</thead>
<tbody>
<tr>
<td>The student will be able to:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compare data representations</td>
<td>MA 3</td>
<td>DP</td>
<td>Ap</td>
<td>The students will given quantitative data and display the distribution when completing the lesson &quot;Impact of a Superstar&quot; along with an on-line activity &quot;Line of Best Fit&quot;</td>
<td>Students will be display the distribution and describe its shape of a given one-variable quantitative data with class activity worksheet.</td>
<td>80%</td>
</tr>
<tr>
<td>- Given one-variable quantitative data, display the distribution and describe its shape</td>
<td>1.8</td>
<td>2.B.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Integrated Skills: Technology**
## Data and Probability

### 2. Select and use appropriate statistical methods to analyze data

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<th>Assessments (including Performance-based)</th>
<th>Mastery Min. %</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Represent data algebraically</strong></td>
<td>MA 3 1.6</td>
<td>DP 2.C.</td>
<td>A</td>
<td>The students will gather bivariate data when completing the lesson &quot;Take Your Time&quot; from the NY Times. Example: Students could survey by gender the same leisure activities. <a href="http://www.nytimes.com/learning/teachers/lessons/archive.html">http://www.nytimes.com/learning/teachers/lessons/archive.html</a></td>
<td>Students will analyze bivariate data where one variable is categorical and the other is numerical when completing a performance based assessment.</td>
<td>80%</td>
</tr>
</tbody>
</table>

### Integrated Skills:
### Data and Probability

#### 3. Develop and evaluate inferences and predictions that are based on data.

<table>
<thead>
<tr>
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<th>Assessments (including Performance-based)</th>
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</tr>
</thead>
</table>
| The student will be able to: |                        | E        |    | >The students will describe how sample statistics reflect the values of population parameters when working with M & M's is a sampling activity.  
http://www.teacherlink.org/content/math/activities/ex-mmgraphing/home.html  
> The students will describe how sample statistics reflect the values of population parameters and use sampling distributions when working with the TI-83 graphing calculators,  
www.successlink.org  
Graphing Calculators 101 | Students will describe how sample statistics reflect the values of population parameters and use sampling distributions as the basis for informal inference with a textbook assignment.  
And/or  
completing the worksheet that accompanies the on-line lesson “Replacement and Probability”  
http://www.shodor.org/interactivate/lessons/replace.html | 80% |

**Integrated Skills:**
## Data and Probability

**4. Understand and apply basic concepts of probability.**

<table>
<thead>
<tr>
<th>Measurable Learner Objective</th>
<th>Assessed Show-Me Goals</th>
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<th>BT</th>
<th>Instructional Strategies/Student Activities/Resources</th>
<th>Assessments (including Performance-based)</th>
<th>Mastery Min. %</th>
</tr>
</thead>
<tbody>
<tr>
<td>The student will be able to:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Students will describe the concepts of sample space and probability when completing a variety of on-line activities at the following website:</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>&gt; The students will describe the concepts of sample space and probability when completing the SuccessLink lesson “Let’s Play Powerball” <a href="http://www.successlink.org">www.successlink.org</a></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>&gt; The students will describe the concepts of sample space and probability distribution when working with the on-line activity “Hamlet Happens” <a href="http://nlvm.usu.edu/en/nav/frames_asid_310_g_3_t_5.html">http://nlvm.usu.edu/en/nav/frames_asid_310_g_3_t_5.html</a></td>
<td></td>
</tr>
</tbody>
</table>

**Integrated Skills:**
### Data and Probability

#### 4. Understand and apply basic concepts of probability.

<table>
<thead>
<tr>
<th>Measurable Learner Objective</th>
<th>Assessed Show-Me Goals</th>
<th>CLE Code</th>
<th>BT Instructional Strategies/Student Activities/Resources</th>
<th>Assessments (including Performance-based)</th>
<th>Mastery Min. %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use and describe compound events</td>
<td>MA 6 1.10 4.1</td>
<td>DP 4.B.</td>
<td>&gt;The students will use and describe the concepts of conditional probability and independent events when completing the SuccessLink lesson “Truth Tables” <a href="http://www.successlink.org">www.successlink.org</a></td>
<td>Students will describe the concepts of conditional probability and independent events when completing classroom activities.</td>
<td>80%</td>
</tr>
</tbody>
</table>

**Integrated Skills:**

Grade: Undefined Grade  
Course: * Algebra II  
Discipline: Math

### Additional Course Information:

**Course Description**

Algebra II is a yearlong course designed for students who have mastered Algebra I and plan to continue with higher-level math and science courses. The course begins with a review of basic concepts of Algebra I and contains a rigorous, comprehensive study of advanced algebra topics including geometry and trigonometry.

**Course Rationale:**

The math processes of modeling, predicting and communication are important in that they are stepping stones to learning how to reason and think abstractly. Students will add mathematical tools to their repertoires and learn how to apply them to real-world situations. They will learn to make predictions and defend them, as well as why making educated guesses are important.
Objectives:

Assessment Activity
Observation, homework, quizzes, and teacher-created test to determine the ability to accurately graph linear equations, inequalities, and absolute value.

Level of Expectation
75%

Learning Activity
Open discussion to grasp basic graphing concepts. Note taking and graphing to accurately graph linear equations. Use of graphing calculators throughout the unit to discover patterns involving the orientation on the coordinate plane.

Instructional Method
Teacher demonstration, modeling, guided practice, independent practice,

Content Standards
MA 4, MA 2

Process Standards
1.6, 3.1, 3.6, 3.4

Resources
Textbook and teacher created resources

Grade Level Expectations

<table>
<thead>
<tr>
<th>CLE Code</th>
<th>Discipline</th>
<th>Strand</th>
<th>Big Idea</th>
<th>Concept</th>
<th>Grade Level/Course</th>
<th>CLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>MA/2/1/D/11/a</td>
<td>Math</td>
<td>Algebraic Relationships</td>
<td>Understand patterns, relations and functions</td>
<td>Identify and compare</td>
<td>Grade 11</td>
<td>understand and compare the properties of linear, quadratic,</td>
</tr>
</tbody>
</table>
## Assessment Activity

Observation, homework, quizzes, teacher-created test involving the use of 3 methods of solving systems (graphing, substitution, linear combination), finding the max and min of a system, and solving word problems involving systems.

## Level of Expectation

80%

## Learning Activity

Use transparency forms on graphs with pairs or groups to determine the solution to systems of inequalities. Give groups of students (usually 3) systems on index cards and have them determine the solution. Note taking and guided practice to learn 3 ways to solve the systems (graphing, substitution, and linear combination), interpret outcomes, find max and mins, and solve word problems.

## Instructional Method

Teacher demonstration, modeling, class discussion, group activities, independent practice.

## Content Standards

MA 4

## Process Standards

1.8, 1.6
Resources
Textbook and teacher created resources

Assessment Activity
Observation, homework, quizzes, teacher-created test involving determining central tendencies and applying them to real-world problems.

Level of Expectation
85%

Learning Activity
Determine central tendencies. Use inside-outside circle an think-pair-share activities to learn to defend a particular statement (application). Note taking and worksheets to learn real-world applications of statistics.

Instructional Method
Lecture, discussion, cooperative learning, example study, guided practice, discussion.

Content Standards
MA 3

Process Standards
1.10, 3.4

Resources
Textbook and teacher created resources

Grade Level Expectations

<table>
<thead>
<tr>
<th>CLE Code</th>
<th>Discipline</th>
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<th>CLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>MA/5/2/A/11/a</td>
<td>Math</td>
<td>Data and Probability</td>
<td>Select and use appropriate statistical methods to</td>
<td>Describe and analyze data</td>
<td>Grade 11</td>
<td>apply statistical concepts to solve problems and distinguish between a</td>
</tr>
</tbody>
</table>
Assessment Activity

Observation, homework, quizzes, and teacher-created test with problems involving the simplification of expressions, solving equations with complex numbers, and graph complex numbers.

Level of Expectation

75%

Learning Activity

Group students in pairs and have them solve equations that they couldn't do before when limited to the real numbers. Given the chart, have pairs or groups determine i to high powers such as i^{102}. Have the students stand and physically graph complex numbers on the imaginary plane.

Instructional Method

Review problems that have no real solution/show the relation of number sets/provide examples (notes)/guided practice

Content Standards

MA 4, MA 5

Process Standards

1.6, 3.2

Resources

Textbook and teacher created resources

Assessment Activity

Observation, homework, quizzes, teacher-created test involving compound interest problems and exponential growth/decay.

Level of Expectation
Learning Activity

Students create their own investment scenario and evaluate the outcome (using calculators). Note taking and discussion involving the formula variables, applications to real-life situations, and the identification and graphs of exponential growth and decay.

Instructional Method

Teacher demonstration, discussion, real-life application activity.

Content Standards

MA 6, MA 4

Process Standards

1.6, 3.1, 4.1

Resources

Textbook and teacher created resources

Grade Level Expectations

<table>
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<tr>
<th>CLE Code</th>
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</thead>
<tbody>
<tr>
<td>MA/2/1/D/11/a</td>
<td>Math</td>
<td>Algebraic Relationships</td>
<td>Understand patterns, relations and functions</td>
<td>Identify and compare functions</td>
<td>Grade 11</td>
<td>understand and compare the properties of linear, quadratic, exponential, logarithmic and rational functions (include asymptotes)</td>
</tr>
<tr>
<td>MA/2/1/E/11/a</td>
<td>Math</td>
<td>Algebraic Relationships</td>
<td>Understand patterns, relations and functions</td>
<td>Describe the effects of parameter changes</td>
<td>Grade 11</td>
<td>describe the effects of parameter changes on logarithmic and exponential functions</td>
</tr>
<tr>
<td>MA/2/2/A/11/a</td>
<td>Math</td>
<td>Algebraic Relationships</td>
<td>Represent and analyze mathematical situations and structures using algebraic symbols</td>
<td>Represent mathematical situations</td>
<td>Grade 11</td>
<td>use symbolic algebra to represent and solve problems that involve exponential and logarithmic relationships, including recursive and</td>
</tr>
</tbody>
</table>
**Assessment Activity**

Observation, homework, quizzes, teacher-created test involving the application of exponents, the simplification of radical expressions, the use of a calculator to determine values, and solving equations.

**Level of Expectation**

70%

**Learning Activity**

Calculator exploration: $x^y$ $x^{(1/y)}$ nth roots. Note taking and worksheets involving the application of properties of exponents, simplification of radical expressions, finding nth roots, and solve equations.

**Instructional Method**

Lecture, guided practice, discussion

**Content Standards**

MA 1, MA 4

**Process Standards**

1.6, 3.4

**Resources**

Textbook and teacher created resources

**Grade Level Expectations**

<table>
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<tr>
<th>CLE Code</th>
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<tbody>
<tr>
<td>MA/2/1/D/11/a</td>
<td>Math</td>
<td>Algebraic</td>
<td>Understand patterns,</td>
<td>Identify and</td>
<td>Grade 11</td>
<td>understand and compare the</td>
</tr>
</tbody>
</table>
Assessment Activity

Feedback, homework, quizzes, teacher-written performance event test item.

Level of Expectation

80%

Learning Activity

Notetaking. Think-pair-share. Graph on the coordinate plane a system of inequalities (constraints) and determine a minimum or maximum value using an equation (objective quantity).

Instructional Method

Note taking, class discussions, teacher demonstration, guided and independent practice, cooperative learning.

Content Standards

MA 4

Process Standards

1.8, 1.6

Resources

Textbook and teacher created resources

Grade Level Expectations

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</table>

properties of linear, quadratic, exponential, logarithmic and rational functions (include asymptotes)
Assessment Activity

Observation, homework, quizzes, teacher-created test involving the application of properties, the evaluation of log expressions with and without a calculator, and solving logarithm equations.

Level of Expectation

80%

Learning Activity

Give students data of an exponential growth or decay and have them graph it in pairs or groups/jigsaw activity. Note taking and guided practice involving logarithms (evaluate with and without a calculator, apply properties, use change of base formula, and solve equations).

Instructional Method

Lecture, class discussion, guided practice, cooperative learning.

Content Standards

MA 6, MA 4

Process Standards

1.6, 3.1, 4.1, 1.10

Resources

Textbook and teacher created materials

Grade Level Expectations
<table>
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<tr>
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</thead>
<tbody>
<tr>
<td>MA/1/2/C/11/a</td>
<td>Math</td>
<td>Number and Operations</td>
<td>Understand meanings of operations and how they relate to one another</td>
<td>Apply properties of operations</td>
<td>Grade 11</td>
<td>apply properties of logarithms to simplify expressions or solve equations</td>
</tr>
<tr>
<td>MA/2/2/C/11/a</td>
<td>Math</td>
<td>Algebraic Relationships</td>
<td>Represent and analyze mathematical situations and structures using algebraic symbols</td>
<td>Utilize equivalent forms</td>
<td>Grade 11</td>
<td>use and solve equivalent forms of equations and inequalities (exponential, logarithmic and rational)</td>
</tr>
<tr>
<td>MA/2/4/A/11/a</td>
<td>Math</td>
<td>Algebraic Relationships</td>
<td>Analyze change in various contexts</td>
<td>Analyze change</td>
<td>Grade 11</td>
<td>analyze exponential and logarithmic functions by investigating rates of change, intercepts and asymptotes</td>
</tr>
</tbody>
</table>

**Assessment Activity**

Observation, homework, quizzes, teacher-created test with constructed response questions involving the determination of order and determinants as well as the application of basic operations (add, subtract, multiply, divide, scalar mult.).

**Level of Expectation**

75%

**Learning Activity**

Give basic matrix equation and ask for input based on intuition. Think-pair-share, inside-outside circle, jigsaw, and note taking involving the determination of matrix order, application of basic operations, and finding the determinant of 2x2 and 3x3 matrices.

**Instructional Method**

Lecture, guided practice, cooperative learning.

**Content Standards**

MA 1, MA 4, MA 5

**Resources**
Textbook and teacher created resources

**Grade Level Expectations**

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<thead>
<tr>
<th>CLE Code</th>
<th>Discipline</th>
<th>Strand</th>
<th>Big Idea</th>
<th>Concept</th>
<th>Grade Level/Course</th>
<th>CLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>MA/1/2/D/11/a</td>
<td>Math</td>
<td>Number and Operations</td>
<td>Understand meanings of operations and how they relate to one another</td>
<td>Apply operations on real and complex numbers</td>
<td>Grade 11</td>
<td>apply operations to matrices and complex numbers, using mental computation or paper-and-pencil calculations for simple cases and technology for more complicated cases</td>
</tr>
</tbody>
</table>

**Assessment Activity**

Observation, homework, quizzes, teacher-created test involving the simplification of polynomials, division methods for polynomials, graph analysis, finding zeros and factoring.

**Level of Expectation**

80%

**Learning Activity**

Use graphing calculators to analyze and predict graph behavior. Note taking and guided practice with polynomials (simplification, long division, synthetic division, graph analysis, finding zeros, and factoring).

**Instructional Method**

Lecture, teacher demonstration, guided practice, discussion.

**Content Standards**

MA 5, MA 2

**Process Standards**

1.6, 3.1, 3.2

**Resources**
### Grade Level Expectations

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<tbody>
<tr>
<td>MA/3/4/B/11/a</td>
<td>Math</td>
<td>Geometric and spatial relationships</td>
<td>Use visualization, spatial reasoning and geometric modeling to solve problems</td>
<td>Draw and use visual models</td>
<td>Grade 11</td>
<td>draw or use visual models to represent and solve problems</td>
</tr>
</tbody>
</table>

### Assessment Activity

Classroom feedback, homework, quizzes, and teacher-written test involving appropriate use of properties, simplification of expressions, and solving equations.

### Level of Expectation

80%

### Learning Activity

Notetaking with properties, expression simplification, and solving equations.

### Instructional Method

Lecture, class discussion, teacher demonstration, modeling, guided and independent practice, cooperative learning.

### Content Standards

MA 4, MA 5

### Process Standards

1.6, 1.10

### Resources

Textbook and Teacher created resources
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<tr>
<td>MA/1/2/C/10/a</td>
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</tbody>
</table>

**Assessment Activity**

Observation, homework, quizzes, teacher-created test to evaluate the ability to solve and graph quadratic equations, apply the quadratic formula, complete the square, analyze equations, and calculate the discriminant and determine the number of solutions.

**Level of Expectation**

80%

**Learning Activity**

Use graphing calculators to learn equation analysis and effects on the plane orientation. Notetaking and practice opportunities involving the application of the quadratic formula, completing the square, equation analysis, and determination of solutions based on the discriminant.

**Instructional Method**

Lecture, teacher demonstration, class discussion, class activities, independent practice.

**Content Standards**

MA 4

**Process Standards**

1.6, 3.1, 4.1, 3.6

**Resources**

Textbook and teacher created resources
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<tbody>
<tr>
<td>MA/2/1/C/11/a</td>
<td>Math</td>
<td>Algebraic Relationships</td>
<td>Understand patterns, relations and functions</td>
<td>Classify objects and representations</td>
<td>Grade 11</td>
<td>compare and contrast various forms of representations of patterns</td>
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<tr>
<td></td>
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<td>understand and compare the properties of linear, quadratic, exponential, exponential, logarithmic and rational functions (include asymptotes)</td>
</tr>
<tr>
<td>MA/2/1/D/11/a</td>
<td>Math</td>
<td>Algebraic Relationships</td>
<td>Understand patterns, relations and functions</td>
<td>Identify and compare functions</td>
<td>Grade 11</td>
<td>describe and use algebraic manipulations, including inverse functions</td>
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<td></td>
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<td></td>
<td></td>
<td>of functions, composition of functions and rules of exponents</td>
</tr>
<tr>
<td>MA/2/2/B/11/a</td>
<td>Math</td>
<td>Algebraic Relationships</td>
<td>Represent and analyze mathematical situations and structures using algebraic symbols</td>
<td>Describe and use mathematical manipulation</td>
<td>Grade 11</td>
<td></td>
</tr>
</tbody>
</table>

**Assessment Activity**

Observation, homework, quizzes, teacher-created test to determine the ability to distinguish between and analyze relations and functions; find the domain, range, and value of functions; find and graph inverses; graph compound and step functions; and determine values of recursive functions.

**Level of Expectation**

75%

**Learning Activity**

Notetaking and worksheets to determine domain and range, evaluate functions and their compositions, find and graph inverses, apply the vertical line test, and find values of recursive functions. In pairs, students will be given index cards with step and compound functions to graph or match.

**Instructional Method**

Lecture and guided practice.
Content Standards
MA 4

Process Standards
1.6, 3.1

Resources
Textbook and teacher created resources

Grade Level Expectations

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<tr>
<td>MA/3/3/B/11/a</td>
<td>Math</td>
<td>Geometric and spatial relationships</td>
<td>Apply transformations and use symmetry to analyze mathematical situations</td>
<td>transformations on functions</td>
<td>Grade 11</td>
<td>perform simple transformations and their compositions on linear, quadratic, logarithmic and exponential functions</td>
</tr>
</tbody>
</table>

Assessment Activity
Observation, homework, quizzes, teacher-created test involving the classification of arithmetic and geometric sequences and series; the use of formulas to find nth terms and sums; and the simplification of factorial expressions.

Level of Expectation
75%

Learning Activity
In pairs (or groups) try to figure out the next term for various sequences. Note taking and discussion involving sequences and series (distinguish between sequence and series as well as arithmetic and geometric, use formulas to determine nth terms and sums, and simplify factorial expressions).

Instructional Method
Guided group practice, discussion of findings, lecture, formula practice
Content Standards
MA 4

Process Standards
1.6

Resources
Textbook and teacher created resources

Grade Level Expectations

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<td>MA/2/1/C/11/a</td>
<td>Math</td>
<td>Algebraic Relationships</td>
<td>Understand patterns, relations and functions representations</td>
<td>Classify objects and representations</td>
<td>Grade 11</td>
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Assessment Activity
Observation, homework, quizzes, and teacher-created test to evaluate understanding of the application of trigonometric concepts.

Level of Expectation
80%

Learning Activity
Calculator use activity, inside-outside circle, and think-pairshare with 6 trig. functions, inverses. Practice real-world problems (such as determining the height of a tree using the shadow length) with worksheets.

Instructional Method
Teacher led review, lecture to introduce 3 new functions, guided
practice, discussion, cooperative learning.

**Content Standards**
MA 2

**Process Standards**
1.6, 1.10

**Resources**
Textbook and teacher resource materials

**Grade Level Expectations**

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<tr>
<td>MA/3/1/A/11/a</td>
<td>Math</td>
<td>Geometric and spatial relationships</td>
<td>Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships</td>
<td>Describe and use geometric relationships</td>
<td>Grade 11</td>
<td>use trigonometric relationships with right trianCLEs to determine lengths and anCLE measures</td>
</tr>
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