

Catasauqua Area School District Planned Course of Study

Course Title: Mathematics

Grade Level(s): 8th

Text: EnVision Mathematics

Course Description

The eighth grade mathematics course is fully aligned with Pennsylvania Common Core standards. Specifically it focuses on the 4 Domains, which include numbers and operations, algebraic concepts, geometry and measurement, data and probability. This program strives to have students make sense of problems and persevere in solving them; construct viable arguments and critique the reasoning of others; use appropriate tools strategically; look for and make use of structure; reason abstractly and quantitatively; model with mathematics; attend to precision; look for and express regularity in repeated reasoning.

Essential Questions

- How is mathematics used to quantify, compare, represent, and model numbers?
- How can mathematics support effective communication?
- How are relationships represented mathematically?
- How can expressions, equations and inequalities be used to quantify, solve, model and/or analyze mathematical situations?
- What does it mean to estimate or analyze numerical quantities?
- What makes a tool and/or strategy appropriate for a given task?
- How can patterns be used to describe relationships in mathematical situations?
- How can data be organized and represented to provide insight into the relationship between quantities?
- How does the type of data influence the choice of display?
- How can probability and data analysis be used to make predictions?
- How can recognizing repetition or regularly assist in solving problems more effectively?
- How are spatial relationships, including shape and dimension, used to draw, construct, model, and represent real situations or solve problems?
- How can the application of the attributes of geometric shapes support mathematical reasoning and problem solving?
- How can geometric properties and theorems be used to describe, model, and analyze situations?

Competencies

- Distinguish between rational and irrational numbers using their properties.
- Convert terminating or repeating decimals into a rational number.
- Use rational approximations of irrational numbers to compare the size of irrational numbers.
- Apply concepts of integer exponents to generate equivalent expressions.
- Use and evaluate square and cube roots to represent solutions to equations.
- Analyze and describe linear relationships between two variables, using slope.
- Make connections between slope, lines and linear equations.

- Interpret solutions to a linear equation and systems of two linear equations.
- Analyze, model and solve linear equations.
- Analyze and solve simultaneous equations.
- Define, interpret, and compare functions displayed algebraically, graphically, numerically in tables or by verbal descriptions.
- Interpret the rate of change and initial value of a linear function in terms of the situation it models and in terms of its graph or given table.
- Apply concepts of volume of cylinders, cones and spheres to solve real world and mathematical problems.
- Use transformations to demonstrate congruence and similarity of geometric figures.
- Use various tools to understand and apply geometric transformations to geometric figures.
- Apply the Pythagorean Theorem and its converse to solve mathematical problems in two and three dimensions.
- Construct, analyze and interpret bivariate data displayed in scatter plots.
- Identify and use linear models to describe bivariate measurement data.
- Use frequencies to analyze patterns of association seen in bivariate data.

Career Awareness, Career Education, & Focus on Employability Skills

Students will develop problem-solving and critical thinking skills throughout the course. Embedded in all units are activities and instructional strategies to improve and promote these skills. Students are regularly expected to make sense of problems and persevere in solving them, reason abstractly and quantitatively, construct viable arguments and critique the reasoning of others, model with mathematics, use appropriate tools strategically, attend to precision, look for and make use of structure, and look for and express regularity in repeated reasoning. There are many projects associated with all units that the students will be using the skills listed above.

Students will continue to improve upon their professionalism by working a STEM project that is correlated with each unit. These projects will also expose students to the application of mathematics in different professional fields. Science and engineering practices such as using the engineering design process, asking questions and defining problems, developing and using models, analyzing and interpreting data, and engaging in argument from evidence will be utilized when the students are working on these STEM projects.

Catasauqua Area School District**Course Title:** Mathematics**Grade Level:** 8th**Course Syllabus**

| Course Content | Tentative Timeframe | Assessment Anchors | State Standards |
|---|----------------------------|--|------------------------------|
| Review of 7th grade curriculum | 1 week - 2 weeks | M07.B-E.1.1.1 M07.B-E.2.1.1 M07.B-E.2.2.1 M07.B-E.2.2.2 M07.B-E.2.3.1 | CC.2.2.7.B.1 CC.2.2.7.B.3 |
| Unit 1 - Real Numbers | September to October | M08.A.N.1.1.3 M08.A.N.1.1.4 M08.A.N.1.1.5 M08.B.E.1.1.1 M08.B.E.1.1.2 M08.B.E.1.1.3 M08.B.E.1.1.4 | CC.2.1.8.E.4 CC.2.2.8.B.1 |
| Unit 2 - Analyze and Solve Linear Equations | November to December | M08.B.E.2.1.1 M08.B.E.2.1.2 M08.B.E.2.1.3 M08.B.E.3.1.1 M08.B.E.3.1.2 M08.B.E.3.1.3 M08.B.E.3.1.4 M08.B.E.3.1.5 | CC.2.2.8.B.2 CC.2.2.8.B.3 |
| Unit 5 - Analyze and Solve Systems of Linear Equations | December to January | M08.B.E.2.1.1 M08.B.E.2.1.2 M08.B.E.2.1.3 M08.B.E.3.1.1 M08.B.E.3.1.2 M08.B.E.3.1.3 M08.B.E.3.1.4 M08.B.E.3.1.5 | CC.2.2.8.B.2 CC.2.2.8.B.3 |
| Unit 3 - Use Functions to Model Relationships | February | M08.B.F.1.1.1 M08.B.F.1.1.2 M08.B.F.1.1.3 M08.B.F.2.1.1 M08.B.F.2.1.2 | CC.2.2.8.C.1 CC.2.2.8.C.2 |
| Unit 6 - Congruence and Similarity | March | M08.C.G.1.1.1 M08.C.G.1.1.2 M08.C.G.1.1.3 M08.C.G.1.1.4 | CC.2.3.8.A.2 |
| Unit 7 - Pythagorean Theorem | April | M08.C.G.2.1.1 M08.C.G.2.1.2 M08.C.G.2.1.3 | CC.2.3.8.A.3 |
| Unit 8 - Solve Problems Involving Surface Area and Volume | April to May | M08.C.G.3.1.1 | CC.2.3.8.A.1 |

| | | | |
|-------------------------------------|----------------|--|------------------------------|
| Unit 4 - Investigate Bivariate Data | May to June | M08.D.S.1.1.1 M08.D.S.1.1.2 M08.D.S.1.1.3 M08.D.S.1.2.1 | CC.2.4.8.B.1 CC.2.4.8.B.2 |
|-------------------------------------|----------------|--|------------------------------|

Teaching Strategies Utilized

Direct Instruction
 Guided Instruction
 Individualized Instruction
 Modeling
 Simulations
 Calculator Demonstrations
 Cooperative Learning
 Station Rotations
 Class Discussions
 Peer/Teacher Tutoring
 Board Work with Teacher/Student Explanations
 Journals
 Games/Competitions
 I-Pad Applications
 Interactive Math Workbook
 Homework
 Independent Practice
 Video Viewing
 Diagnostic, formative and summative assessments

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|--|-------------------------------------|---|---|--|---|
| <p>Review of 7th grade curriculum</p> <p><i>The student will be able to:</i></p> <ul style="list-style-type: none"> - add, subtract, multiply, and divide positive numbers - to apply the order of the operations to evaluate numerical and algebraic expressions - to graph and identify points on the coordinate plane | <p>M, R</p> <p>M, R</p> <p>M, R</p> | <p>Note taking</p> <p>Homework</p> <p>Independent work</p> <p>Teacher designed activities</p> <p>Board work</p> <p>Peer/ Teacher tutoring</p> <p>Group work</p> <p>Stations</p> <p>Teacher/Student model skill</p> <p>Teacher.Student model problem solving</p> | <p>Daily Quizzes/Warm ups</p> <p>Homework</p> <p>Classwork</p> <p>Notebooks</p> <p>Quizzes</p> <p>Tests</p> <p>Graded activities</p> <p>Formative assessments</p> | <p>M07.B-E.1.1.1</p> <p>M07.B-E.2.1.1</p> <p>M07.B-E.2.2.1</p> <p>M07.B-E.2.2.2</p> <p>M07.B-E.2.3.1</p> | <p>CC.2.2.7.B.1</p> <p>CC.2.2.7.B.3</p> |
| Resources/Materials | | | | | |
| <p>EnVision Mathematics Workbook from 7th grade</p> <p>Savass Website</p> <p>Online Worksheets and Resources</p> <p>Ipad Apps</p> <p>Calculators</p> <p>Classroom Diagnostic Tests (CDT's)</p> <p>Exact Path</p> <p>Video Tutorials</p> | | | | | |
| Interdisciplinary Relationships & 21st Century Skills | | | | | |
| <ul style="list-style-type: none"> - Each unit has a STEM Project associated with that topic - from 7th grade curriculum - Each unit comprises of four different projects that comes with a variety of different activity modalities such as write, design, plan, tell, graph, build, make, summarize, research, draw - from 7th grade curriculum - Each section includes a problem based learning activity in which students solve and discuss a problem based on that topic - from 7th grade curriculum | | | | | |

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| Unit 1 - Real Numbers | | | | | |
| <i>The student will be able to:</i> | | | | | |
| <i>1-1 Convert Rational Numbers to Decimals</i> | AP, M | Note taking | Daily Quizzes/Warm ups | M08.A.N.1.1.3 M08.A.N.1.1.4 | CC.2.1.8.E.4 CC.2.2.8.B.1 |
| <i>1-2 Understand Rational Numbers</i> | AP, M | Homework | Homework | M08.A.N.1.1.5 M08.B.E.1.1.1 | |
| <i>1-3 Compare and Order Real Numbers</i> | AP, M | Independent work | Homework | M08.B.E.1.1.2 M08.B.E.1.1.3 | |
| <i>1-4 Evaluate Square and Cube Roots</i> | AW, K, AP | Teacher designed activities | Classwork | M08.B.E.1.1.4 | |
| <i>1-5 Solve Equations Using Square and Cube Roots</i> | AW, K, AP | Board work | Notebooks | | |
| <i>1-6 Use Properties of Integer Exponents</i> | AW, K, AP | Peer/ Teacher tutoring | Quizzes | | |
| <i>1-7 Understand Other Properties of Exponents</i> | AW, K, AP | Group work | Tests | | |
| <i>1-9 Understand Scientific Notation</i> | K, AP, M | Stations | Graded activities | | |
| <i>1-10 Operations with Numbers in Schinative Notation</i> | AW, K, AP | Teacher/Student model skill Teacher.Student model problem solving | Formative assessments | | |
| Resources/Materials | | | | | |
| EnVision Mathematics Workbook Savass Website Online Worksheets and Resources Common Core Standards Practice Workbook Additional Practice Workbook Language Support Handbook Assessment Sourcebook Ipad Apps Calculators Classroom Diagnostic Tests (CDT's) Exact Path Video Tutorials | | | | | |

Interdisciplinary Relationships & 21st Century Skills

- Each unit has a STEM Project associated with that topic
- Each unit comprises of four different projects that comes with a variety of different activity modalities such as write, design, plan, tell, graph, build, make, summarize, research, draw
- Each section includes a problem based learning activity in which students solve and discuss a problem based on that topic

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|--|---|---|---|---|---------------------------------------|
| <p>Unit 2 - Analyze and Solve Linear Equations</p> <p><i>The student will be able to:</i></p> <p>2-1 Combine Like Terms to Solve Equations</p> <p>2-2 Solve Equations with Variables on Both Sides</p> <p>2-3 Solve Multi Step Equations</p> <p>2-4 Equations with No Solutions or Infinitely Many Solutions</p> <p>2-5 Compare Proportional Relationships</p> <p>2-6 Connect Proportional Relationships and Slope</p> <p>2-7 Analyze Linear Equations: $y = mx$</p> <p>2-8 Understand the y-intercept of a Line</p> <p>2-9 Analyze Linear Equations: $y = mx + b$</p> | <p>AP, M, R</p> <p>K, AP, M</p> <p>AW, K, AP</p> <p>AW, K, AP</p> <p>K, AP, M</p> <p>AW, K, AP</p> <p>AW, K, AP</p> <p>AW, K, AP</p> <p>AW, K, AP</p> | <p>Note taking</p> <p>Homework</p> <p>Independent work</p> <p>Teacher designed activities</p> <p>Board work</p> <p>Peer/ Teacher tutoring</p> <p>Group work</p> <p>Stations</p> <p>Teacher/Student model skill</p> <p>Teacher.Student model problem solving</p> | <p>Daily Quizzes/Warm ups</p> <p>Homework</p> <p>Classwork</p> <p>Notebooks</p> <p>Quizzes</p> <p>Tests</p> <p>Graded activities</p> <p>Formative assessments</p> | <p>M08.B.E.2.1.1 M08.B.E.2.1.2 M08.B.E.2.1.3 M08.B.E.3.1.1 M08.B.E.3.1.2 M08.B.E.3.1.3 M08.B.E.3.1.4 M08.B.E.3.1.5</p> | <p>CC.2.2.8.B.2 CC.2.2.8.B.3</p> |
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| <p>Unit 5 - Analyze and Solve Systems of Linear Equations</p> <p><i>The student will be able to:</i></p> <p>5-1 Estimate Solutions by Inspection</p> <p>5-2 Solve Systems by Graphing</p> <p>5-3 Solve Systems by Substitution</p> <p>5-4 Solve Systems by Elimination</p> | <p>AW, K, AP</p> <p>AW, K, AP</p> <p>AW, K, AP</p> <p>AW, K, AP</p> | <p>Note taking</p> <p>Homework</p> <p>Independent work</p> <p>Teacher designed activities</p> <p>Board work</p> <p>Peer/ Teacher tutoring</p> <p>Group work</p> <p>Stations</p> <p>Teacher/Student model skill</p> <p>Teacher.Student model problem solving</p> | <p>Daily Quizzes/Warm ups</p> <p>Homework</p> <p>Classwork</p> <p>Notebooks</p> <p>Quizzes</p> <p>Tests</p> <p>Graded activities</p> <p>Formative assessments</p> | <p>M08.B.E.2.1.1 M08.B.E.2.1.2 M08.B.E.2.1.3 M08.B.E.3.1.1 M08.B.E.3.1.2 M08.B.E.3.1.3 M08.B.E.3.1.4 M08.B.E.3.1.5</p> | <p>CC.2.2.8.B.2 CC.2.2.8.B.3</p> |
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| <p>Unit 3 - Use Functions to Model Relationships</p> <p><i>The student will be able to:</i></p> <p>3-1 Understand Relations and Functions</p> <p>3-2 Connect Representations of Functions</p> <p>3-3 Compare Linear and Nonlinear Functions</p> <p>3-4 Construct Functions to Model Linear Relationships</p> <p>3-5 Intervals of Increase and Decrease</p> | <p>AW, K, AP</p> <p>AW, K, AP</p> <p>AW, K, AP</p> <p>AW, K, AP</p> <p>AW, K, AP</p> | <p>Note taking</p> <p>Homework</p> <p>Independent work</p> <p>Teacher designed activities</p> <p>Board work</p> <p>Peer/ Teacher tutoring</p> <p>Group work</p> <p>Stations</p> <p>Teacher/Student model skill</p> <p>Teacher.Student model problem solving</p> | <p>Daily Quizzes/Warm ups</p> <p>Homework</p> <p>Classwork</p> <p>Notebooks</p> <p>Quizzes</p> <p>Tests</p> <p>Graded activities</p> <p>Formative assessments</p> | <p>M08.B.F.1.1.1</p> <p>M08.B.F.1.1.2</p> <p>M08.B.F.1.1.3</p> <p>M08.B.F.2.1.1</p> <p>M08.B.F.2.1.2</p> | <p>CC.2.2.8.C.1</p> <p>CC.2.2.8.C.2</p> |
| Resources/Materials | | | | | |
| <p>EnVision Mathematics Workbook</p> <p>Savass Website</p> <p>Online Worksheets and Resources</p> <p>Common Core Standards Practice Workbook</p> <p>Additional Practice Workbook</p> <p>Language Support Handbook</p> <p>Assessment Sourcebook</p> <p>Ipad Apps</p> <p>Calculators</p> <p>Classroom Diagnostic Tests (CDT's)</p> <p>Exact Path</p> <p>Video Tutorials</p> | | | | | |

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| <p>Unit 6 - Congruence and Similarity</p> <p><i>The student will be able to:</i></p> <p>6-1 Analyze Translations</p> <p>6-2 Analyze Reflections</p> <p>6-3 Analyze Rotations</p> <p>6-4 Compose Transformations</p> | <p>AW, K, AP</p> <p>AW, K, AP</p> <p>AW, K, AP</p> <p>AW, K, AP</p> | <p>Note taking</p> <p>Homework</p> <p>Independent work</p> <p>Teacher designed activities</p> <p>Board work</p> <p>Peer/ Teacher tutoring</p> <p>Group work</p> <p>Stations</p> <p>Teacher/Student model skill</p> <p>Teacher.Student model problem solving</p> | <p>Daily Quizzes/Warm ups</p> <p>Homework</p> <p>Classwork</p> <p>Notebooks</p> <p>Quizzes</p> <p>Tests</p> <p>Graded activities</p> <p>Formative assessments</p> | <p>M08.C.G.1.1.1</p> <p>M08.C.G.1.1.2</p> <p>M08.C.G.1.1.3</p> <p>M08.C.G.1.1.4</p> | <p>CC.2.3.8.A.2</p> |
| Resources/Materials | | | | | |
| <p>EnVision Mathematics Workbook</p> <p>Savass Website</p> <p>Online Worksheets and Resources</p> <p>Common Core Standards Practice Workbook</p> <p>Additional Practice Workbook</p> <p>Language Support Handbook</p> <p>Assessment Sourcebook</p> <p>Ipad Apps</p> <p>Calculators</p> <p>Classroom Diagnostic Tests (CDT's)</p> <p>Exact Path</p> <p>Video Tutorials</p> | | | | | |

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| <p>Unit 7 - Understand and Apply the Pythagorean Theorem</p> <p><i>The student will be able to:</i></p> <p>7-1 Understand the Pythagorean Theorem</p> <p>7-2 Understand the Converse of the Pythagorean Theorem</p> <p>7-3 Apply the Pythagorean Theorem to Solve Problems</p> | <p>AW, K, AP</p> <p>AW, K, AP</p> <p>AW, K, AP</p> | <p>Note taking</p> <p>Homework</p> <p>Independent work</p> <p>Teacher designed activities</p> <p>Board work</p> <p>Peer/ Teacher tutoring</p> <p>Group work</p> <p>Stations</p> <p>Teacher/Student model skill</p> <p>Teacher.Student model problem solving</p> | <p>Daily Quizzes/Warm ups</p> <p>Homework</p> <p>Classwork</p> <p>Notebooks</p> <p>Quizzes</p> <p>Tests</p> <p>Graded activities</p> <p>Formative assessments</p> | <p>M08.C.G.2.1.1</p> <p>M08.C.G.2.1.2</p> <p>M08.C.G.2.1.3</p> | <p>CC.2.3.8.A.3</p> |
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| <p>Unit 8 - Solve Problems Involving Surface Area and Volume</p> <p><i>The student will be able to:</i></p> <p>8-2 Find the Volume of Cylinders</p> <p>8-3 Find the Volume of Cones</p> <p>8-4 Find the Volume of Spheres</p> | <p>K, AP, M</p> <p>K, AP, M</p> <p>K, AP, M</p> | <p>Note taking</p> <p>Homework</p> <p>Independent work</p> <p>Teacher designed activities</p> <p>Board work</p> <p>Peer/ Teacher tutoring</p> <p>Group work</p> <p>Stations</p> <p>Teacher/Student model skill</p> <p>Teacher.Student model problem solving</p> | <p>Daily Quizzes/Warm ups</p> <p>Homework</p> <p>Classwork</p> <p>Notebooks</p> <p>Quizzes</p> <p>Tests</p> <p>Graded activities</p> <p>Formative assessments</p> | <p>M08.C.G.3.1.1</p> | <p>CC.2.3.8.A.1</p> |

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| <p>Unit 4 - Understand Bivariate Data</p> <p><i>The student will be able to:</i></p> <p>4-1 Construct and Interpret Scatter Plots</p> <p>4-2 Analyze Linear Association</p> <p>4-3 Use Linear Models to Make Predictions</p> <p>4-4 Interpret Two-Way Frequency Tables</p> | <p>K, AP, M</p> <p>AW, K, AP</p> <p>AW, K, AP</p> <p>AW, K, AP</p> | <p>Note taking</p> <p>Homework</p> <p>Independent work</p> <p>Teacher designed activities</p> <p>Board work</p> <p>Peer/ Teacher tutoring</p> <p>Group work</p> <p>Stations</p> <p>Teacher/Student model skill</p> <p>Teacher.Student model problem solving</p> | <p>Daily Quizzes/Warm ups</p> <p>Homework</p> <p>Classwork</p> <p>Notebooks</p> <p>Quizzes</p> <p>Tests</p> <p>Graded activities</p> <p>Formative assessments</p> | <p>M08.D.S.1.1.1 M08.D.S.1.1.2 M08.D.S.1.1.3 M08.D.S.1.2.1</p> | <p>CC.2.4.8.B.1 CC.2.4.8.B.2</p> |

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- Each unit has a STEM Project associated with that topic
- Each unit comprises of four different projects that comes with a variety of different activity modalities such as write, design, plan, tell, graph, build, make, summarize, research, draw
- Each section includes a problem based learning activity in which students solve and discuss a problem based on that topic