

PLANNED COURSE CURRICULUM GUIDE GEOMETRY

I. COURSE DESCRIPTION AND INTENT:

II. INSTRUCTIONAL TIME:

Class Periods:

Length of Class Periods (minutes): 42

Length of Course: 180 days; 120 clock hours

Unit of Credit:

Course Weight:

A GREAT PLACE TO LEARN!



PINE GROVE AREA SCHOOL DISTRICT
PINE GROVE, PENNSYLVANIA

PINE GROVE AREA SCHOOL DISTRICT
Pine Grove, Pennsylvania 17963

PLANNED COURSE ADAPTATIONS/MODIFICATIONS
Introduction

The instructional adaptations that follow are provided as suggestions to be implemented with all students, particularly with those in need of special education services including the gifted. This listing is in no way intended to be exhaustive. Rather, it is reflective of some major considerations in the area of curriculum adaptations/modifications.

These instructional adaptations will work with any student, but are especially beneficial to those in need of learning support. Some may argue that these modifications are simply *good teaching*. Indeed, modifications of this type do represent good teaching. These principles of good teaching become instructional modifications whenever: (1) certain students in a particular class require such modifications *above and beyond* what is typically required by *most* students in that class and (2) without these modifications, these same students would not succeed.

PREFACE

Users and information seekers should familiarize themselves with the purpose and terminology of this **Planned Course Curriculum Guide (PCCG)**. We suggest that you first read the following:

- **PCCG PURPOSE AND INTENT**
- **PCCG DEFINITIONS**

The PCCG specifies the unit lesson outcome, essential content, standards, activities, resources, and evaluation of student performance. This sector provides the means to initiate the learning activities to attain the program goal as identified in the course description and intent.

The standards and outcomes are minimal expectations; further embellishment of the course is discretionary with the instructor depending upon the capability of the students.

This PCCG is designed as an ACTIVE document capable of technological modification as required.

The instructional delivery of this curriculum is quality controlled through the lesson plan development of the teacher.

Lawrence J. Mussoline, Jr., Ph.D.
Superintendent of Schools

PLANNED COURSE CURRICULUM GUIDE (PCCG) PURPOSE AND INTENT

The Planned Course Curriculum Guide (PCCG) is a multi-purpose document:

- All staff, particularly new teachers, can understand instructional expectations through the WRITTEN curriculum
- A continuing district-wide instructional process and scope and sequence of subject matter are enhanced. The WRITTEN curriculum is delivered through the TAUGHT curriculum (instructional content and learning activities) and is evaluated through the TESTED curriculum (expected levels of student achievement - learning outcomes)
- Priority student-centered outcomes are identified and attained through suggested learning activities and content designed to help insure a balanced and comprehensive basic curriculum
- Essential content and course standards provide an efficient basis for selecting appropriate instructional materials and resources
- Staff development areas for curriculum improvement are provided
- The PCCG conforms with current Pennsylvania Department of Education curriculum regulations and serves the dual feature of providing both an administrative document and an instructional guide
- Content and subject format remain flexible and adaptable to modification - an "active" document
- Special Pennsylvania Department of Education (PDE) legislation is identified
- Parents and students are provided with an overview of the instructional program and each course in particular

PLANNED COURSE CURRICULUM GUIDE (PCCG) DEFINITIONS

- **Course Description and Intent**: a brief overview of the course and program goals
- **Instructional Time**: frequency of class meetings and time/appropriate credit at the secondary level
- **Special Notes**: emphatic features or highlights and identification of Department of Education mandates found in the course
- **Unit Lesson Outcome**: describes the knowledge, skills, attitudes, student performance behaviors and areas of study that have been identified as appropriate to help the student attain the rigorous standards of a quality education
- **Teaching-Learning Activities**: suggested activities designed to help all students achieve the learning outcomes and standards
- **Standards**: statements establishing the minimal knowledge, skills, performance behaviors, and essential learning (content) a student must attain. A standard defines what students should know and be able to do
- **Expected Levels of Achievement (Learning Outcomes)**: what students will be expected to do as a result of the application of teaching-learning activities and content
- **Evaluation Criteria (Actual Level of Attainment)**: student performance level achieved and measured through specified evaluation criteria

LEARNING STANDARDS AND CONTENT ACTIVITIES

Statement of student learning expectations achieved through suggested teaching-learning activities and selected content to help reach standards and graduation requirements.

Academic Content Standard #1: All students use numbers, number systems, and number relationships to represent theoretical and practical situations. Number types (e.g., whole, prime, irrational, and complex) and equivalent forms (e.g., fractions, decimals, and percents) are mastered.

ESSENTIAL CONTENT PERFORMANCE STANDARD	CONTENT & INSTRUCTIONAL ACTIVITIES/STRATEGIES WITH CORRECTIVES AND EXTENSIONS <i>(individually created teaching activities may be used to achieve the standards; however, listed below are activities which may be helpful) ☺</i>	ACTUAL LEVEL OF ATTAINMENT (EVALUATION CRITERIA) ASSESSMENT	RESOURCES AND MATERIALS
<p>STANDARD 1</p> <p>78. Describe and apply inverse operations (reciprocal, absolute value, raising to power, finding roots) to solve equations and inequalities.</p>	<p>78. Solve a variety of problems using formulas.</p> <p><u>Correctives</u> – Review worksheets and supplemental problems at the end of every chapter and in the back section of the book.</p> <p><u>Extensions</u> – Solve more complex problems.</p>	<ul style="list-style-type: none"> • Teacher-made/commercial tests • Board work complete with oral explanation • Student notebooks 	<ul style="list-style-type: none"> • Textbook – <u>Geometry</u> • Maps and various scale drawings • Various resource books • Various models and manipulation for finding volume • Computer software, especially CCC program • Internet

LEARNING STANDARDS AND CONTENT ACTIVITIES

Statement of student learning expectations achieved through suggested teaching-learning activities and selected content to help reach standards and graduation requirements.

Academic Content Standard #2: All students use computation and estimation skills to solve theoretical and practical problems using appropriate tools including modern technology such as calculators and computers.

ESSENTIAL CONTENT PERFORMANCE STANDARD	CONTENT & INSTRUCTIONAL ACTIVITIES/STRATEGIES WITH CORRECTIVES AND EXTENSIONS <i>(individually created teaching activities may be used to achieve the standards; however, listed below are activities which may be helpful) ☺</i>	ACTUAL LEVEL OF ATTAINMENT (EVALUATION CRITERIA) ASSESSMENT	RESOURCES AND MATERIALS
<p>STANDARD 2</p> <p>69. Simplify irrational expressions involving roots.</p> <p>72. Perform calculations by applying rules for exponents and roots.</p> <p>73. Develop and use computation concepts, operations and procedures on real numbers in problem-solving situations.</p> <p>78. Demonstrate skills for using computer spreadsheets and scientific and /or graphing calculators.</p>	<p>69. Solve equations using the Pythagorean Theorem.</p> <p>72. Solve problems involving the Pythagorean Theorem, areas, and volumes.</p> <p>73. Solve triangle problems using linear and quadratic equations.</p> <p>78. Use a graphing calculator to find points on a line, curve, or circle.</p> <p><u>Correctives</u> – Review worksheet and supplemental problems at the end of every chapter.</p> <p><u>Extensions</u> – Work on advanced problems in text.</p>	<ul style="list-style-type: none"> • Teacher-made/commercial tests • Board work • Student notebooks 	<ul style="list-style-type: none"> • Textbook – <u>Geometry</u> • Various resource books • Computer software esp. CCC Program • Internet • Compass • Protractor • Ruler

LEARNING STANDARDS AND CONTENT ACTIVITIES

Statement of student learning expectations achieved through suggested teaching-learning activities and selected content to help reach standards and graduation requirements.

Academic Content Standard #3: All students use measurement and estimation skills to solve theoretical and practical problems.

ESSENTIAL CONTENT PERFORMANCE STANDARD	CONTENT & INSTRUCTIONAL ACTIVITIES/STRATEGIES WITH CORRECTIVES AND EXTENSIONS <i>(individually created teaching activities may be used to achieve the standards; however, listed below are activities which may be helpful) ☺</i>	ACTUAL LEVEL OF ATTAINMENT (EVALUATION CRITERIA) ASSESSMENT	RESOURCES AND MATERIALS
<p>STANDARD 3</p> <p>61. Determine relationships between linear, square, and cubic measures, describe how changes in one of the measures of the figure affect the others, and apply these concepts to real world problems.</p> <p>63. Select and use appropriate units and tools to collect and apply data with appropriate levels of precision.</p>	<p>61. Find area of various figures using formulas. Find volume of solids using formulas. Estimate area and volume using real-life models. Find area and volume when diagram has mixed units.</p> <p>63. Use protractor to measure angles. Use ruler – inches and centimeters.</p> <p><u>Correctives</u> – Use of protractor will be reviewed all year.</p> <p><u>Extensions</u> – Use real-life diagrams to estimate area. Use water and measuring cup to estimate volume.</p>	<ul style="list-style-type: none"> • Teacher-made/commercial tests • Board work • Student notebooks 	<ul style="list-style-type: none"> • Textbook – <u>Geometry</u> • Various resource books • Computer software esp. CCC Program • Internet • Compass • Protractor • Ruler

LEARNING STANDARDS AND CONTENT ACTIVITIES

Statement of student learning expectations achieved through suggested teaching-learning activities and selected content to help reach standards and graduation requirements.

Academic Content Standard #4: All students use mathematical reasoning and make mathematical connections.

ESSENTIAL CONTENT PERFORMANCE STANDARD	CONTENT & INSTRUCTIONAL ACTIVITIES/STRATEGIES WITH CORRECTIVES AND EXTENSIONS <i>(individually created teaching activities may be used to achieve the standards; however, listed below are activities which may be helpful) ©</i>	ACTUAL LEVEL OF ATTAINMENT (EVALUATION CRITERIA) ASSESSMENT	RESOURCES AND MATERIALS
<p>STANDARD 4</p> <p>33. Construct algorithms for multi-step and real-world problems.</p> <p>35. Use if-then, converse, inverse, and/or contra-positive statements to construct simple valid arguments.</p> <p>38. Apply appropriate arguments, proofs, (inductive and deductive), and mathematical rules and properties of logic in problem-solving situations.</p>	<p>33. Solve problems using a variety of methods.</p> <p>35. Use if-then, converse and inverse statements and test the validity of arguments.</p> <p>38. Inductive and deductive reasoning is used to complete two-column proofs. Students will practice direct and indirect proofs. Students will construct valid arguments through the use of two-column proofs.</p> <p><u>Correctives</u> – Students write two-column proofs as part of assignments, quizzes, and tests.</p> <p><u>Extensions</u> – Challenge students with difficult proofs.</p>	<ul style="list-style-type: none"> • Teacher-made/commercial tests • Board work • Student notebooks 	<ul style="list-style-type: none"> • Textbook – <u>Geometry</u> • Various resource books • Computer software esp. CCC Program • Internet • Compass • Protractor • Ruler

LEARNING STANDARDS AND CONTENT ACTIVITIES

Statement of student learning expectations achieved through suggested teaching-learning activities and selected content to help reach standards and graduation requirements.

Academic Content Standard #5: All students formulate and solve problems, communicate the mathematical process used, and the reasons for using them.

ESSENTIAL CONTENT PERFORMANCE STANDARD	CONTENT & INSTRUCTIONAL ACTIVITIES/STRATEGIES WITH CORRECTIVES AND EXTENSIONS <i>(individually created teaching activities may be used to achieve the standards; however, listed below are activities which may be helpful) ☺</i>	ACTUAL LEVEL OF ATTAINMENT (EVALUATION CRITERIA) ASSESSMENT	RESOURCES AND MATERIALS
<p>STANDARD 5</p> <p>33. Construct algorithms for solving multi-step and non-routine real world problems.</p> <p>34. Explain the components of mathematical modeling: problem formation, mathematical model, solution with the model, and validation in real world situations.</p> <p>35. Create and solve complex problems using appropriate mathematical concepts and techniques.</p> <p>36. Communicate, both in writing and orally, mathematical concepts, problems, procedures, and solutions using appropriate mathematical</p>	<p>33. Solve problems using a variety of methods.</p> <p>34. Construct a model, find a solution using the model, and test the solution for validity.</p> <p>35. Present math concepts using necessary and sufficient language to illustrate the solution to a problem.</p> <p>36. Communicate math concepts both oral and written.</p>	<ul style="list-style-type: none"> • Teacher-made/commercial tests • Board work • Student notebooks 	<ul style="list-style-type: none"> • Textbook – <u>Geometry</u> • Various resource books • Computer software esp. CCC Program • Internet • Compass • Protractor • Ruler

language.

Correctives – Definitions and theorems are reviewed throughout the year. Students are always doing proofs at the board.

Extensions – Work on advanced problems in text.

LEARNING STANDARDS AND CONTENT ACTIVITIES

Statement of student learning expectations achieved through suggested teaching-learning activities and selected content to help reach standards and graduation requirements.

Academic Content Standard #7: All students make predictions based upon the collection, organization, analyzing, and interpretation of statistical data and the application of probability.

ESSENTIAL CONTENT PERFORMANCE STANDARD	CONTENT & INSTRUCTIONAL ACTIVITIES/STRATEGIES WITH CORRECTIVES AND EXTENSIONS <i>(individually created teaching activities may be used to achieve the standards; however, listed below are activities which may be helpful) ☺</i>	ACTUAL LEVEL OF ATTAINMENT (EVALUATION CRITERIA) ASSESSMENT	RESOURCES AND MATERIALS
<p>STANDARD 7</p> <p>39. Define, calculate, and compare the probability and odds of an event.</p>	<p>39. Introduce simple probability formula. This topic is introduced early and then reviewed throughout the year. Students will solve simple probability problems.</p> <p><u>Correctives</u> – Students solve simple probability at the end of every chapter.</p> <p><u>Extensions</u> – Demonstrate some more advanced probability problems and encourage students to research them.</p>	<ul style="list-style-type: none"> • Teacher-made/commercial tests • Board work • Student notebooks 	<ul style="list-style-type: none"> • Textbook – <u>Geometry</u> • Various resource books • Computer software esp. CCC Program • Internet • Compass • Protractor • Ruler

LEARNING STANDARDS AND CONTENT ACTIVITIES

Statement of student learning expectations achieved through suggested teaching-learning activities and selected content to help reach standards and graduation requirements.

Academic Content Standard #8: All students understand, demonstrate, and apply basic concepts of algebra to solve theoretical and practical problems.

ESSENTIAL CONTENT PERFORMANCE STANDARD	CONTENT & INSTRUCTIONAL ACTIVITIES/STRATEGIES WITH CORRECTIVES AND EXTENSIONS <i>(individually created teaching activities may be used to achieve the standards; however, listed below are activities which may be helpful) ☺</i>	ACTUAL LEVEL OF ATTAINMENT (EVALUATION CRITERIA) ASSESSMENT	RESOURCES AND MATERIALS
<p>STANDARD 8</p> <p>56. Simplify calculations, rewrite expressions, and combine like terms using the distributive property.</p>	<p>56. Algebra topics such as combining like terms and the distributive property are used to solve many geometry problems. These topics are reviewed many times.</p> <p><u>Correctives</u> – Chapter reviews and occasional algebra worksheets.</p> <p><u>Extensions</u> – SAT review problems.</p>	<ul style="list-style-type: none"> • Teacher-made/commercial tests • Board work • Student notebooks 	<ul style="list-style-type: none"> • Textbook – <u>Geometry</u> • Various resource books • Computer software esp. CCC Program • Internet • Compass • Protractor • Ruler

LEARNING STANDARDS AND CONTENT ACTIVITIES

Statement of student learning expectations achieved through suggested teaching-learning activities and selected content to help reach standards and graduation requirements.

Academic Content Standard #9: All students understand, demonstrate, and apply basic concepts of geometry to solve theoretical and practical problems.

ESSENTIAL CONTENT PERFORMANCE STANDARD	CONTENT & INSTRUCTIONAL ACTIVITIES/STRATEGIES WITH CORRECTIVES AND EXTENSIONS <i>(individually created teaching activities may be used to achieve the standards; however, listed below are activities which may be helpful) ©</i>	ACTUAL LEVEL OF ATTAINMENT (EVALUATION CRITERIA) ASSESSMENT	RESOURCES AND MATERIALS
STANDARD 9 65. Create and identify congruent polygons and their corresponding parts. 66. Apply properties of parallel lines to determine angle measures. 67. Construct deductive proofs involving segments and angles. 68. Identify and draw medians, altitudes, angle bisectors, and perpendicular bisectors in a triangle. 69. Describe relationships between sides and angles in a triangle. 71. Identify and name faces, edges, and vertices of polyhedron. 72. Calculate the areas of	65. Create and identify congruent polygons and their corresponding parts. 66. Apply properties of parallel lines to determine angle measures. 67. Construct deductive proofs involving segments and angles. 68. Identify and draw medians, altitudes, angle bisectors, and perpendicular bisectors in a triangle. 69. Describe relationships between sides and angles in a triangle. 71. Identify and name faces, edges, and vertices of polyhedron. 72. Calculate the areas of various	<ul style="list-style-type: none"> • Teacher-made/commercial tests • Board work • Student notebooks 	<ul style="list-style-type: none"> • Textbook – <u>Geometry</u> • Various resource books • Computer software esp. CCC Program • Internet • Compass • Protractor • Ruler

<p>parallelograms, triangles, rhombi, trapezoids, regular polygons, and circles.</p>	<p>geometric figures.</p>		
<p>73. Describe and define properties of geometric solids.</p>	<p>73. Geometric solids – Find area and volume using formulas.</p>		
<p>74. Solve problems involving the proportional relationship of corresponding parts of similar figures (polygons).</p>	<p>74. Similar figures – identify corresponding parts, review ratio and proportion.</p>		
<p>75. Apply angle measures of polygons to solve problems.</p>	<p>75. Apply angle measures of polygons.</p>		
<p>76. Solve problems involving area and volume.</p>	<p>76. Solve problems involving area and volume.</p>		
<p>77. Determine the surface area and volume of prisms, cylinders, pyramids, cones, and spheres.</p>	<p>77. Geometric solids – surface area and volume formulas.</p>		
<p>80. Prove two triangles or two polygons are congruent or similar using algebraic and coordinate as well as deductive proofs.</p>	<p>80. Prove triangles are congruent or similar using algebraic and coordinate geometry.</p>		
<p>81. Identify and prove the properties of quadrilaterals involving opposite sides and angles, consecutive sides and angles, and diagonals using deductive proofs.</p>	<p>81. Quadrilaterals – special quads and their properties.</p>		
<p>82. Identify corresponding parts in congruent triangles to solve problems.</p>	<p>82. Congruent triangles – corresponding parts.</p>		
<p>83. Solve problems involving inscribed and circumscribed polygons.</p>	<p>83. Polygons – inscribed and circumscribed.</p>		
<p>84. Use the properties of angles, arcs, chords, tangents, and secants to solve problems involving circles.</p>	<p>84. Circles – angles, arcs, chords, . . .</p>		

85. Solve problems using analytic geometry.

86. Model situations geometrically to formulate and solve problems.

85. Graph geometric figures – estimate solutions.

86. Use constructions of figures to estimate answers.

Correctives – Use protractor, compass, and ruler to demonstrate the definitions and theorems. Apply concepts to solve problems in every section of text. Assign problems in textbook. Chapter review. Use constructions to reinforce formulas.

Extensions – Use constructions to estimate solutions and then solve problem using definitions, theorems, and formulas. Assign advanced problems in textbook.

LEARNING STANDARDS AND CONTENT ACTIVITIES

Statement of student learning expectations achieved through suggested teaching-learning activities and selected content to help reach standards and graduation requirements.

Academic Content Standard #10: All students understand, demonstrate, and apply basic concepts of trigonometry to solve theoretical and practical problems.

ESSENTIAL CONTENT PERFORMANCE STANDARD	CONTENT & INSTRUCTIONAL ACTIVITIES/STRATEGIES WITH CORRECTIVES AND EXTENSIONS <i>(individually created teaching activities may be used to achieve the standards; however, listed below are activities which may be helpful) ☺</i>	ACTUAL LEVEL OF ATTAINMENT (EVALUATION CRITERIA) ASSESSMENT	RESOURCES AND MATERIALS
<p>STANDARD 10</p> <p>16. Apply the properties of special (45-45-90 and 30-60-90) right triangles to real-life situations.</p> <p>17. Express trigonometric ratios as fractions or decimals and describe their relationships to right triangles.</p> <p>24. Create, write, and solve real world application problems that demonstrate an understanding of solving right triangles and/or using the Law of Sines and/or the Law of Cosines.</p>	<p>16. Right triangles (45-45-90 and 30-60-90) are studied in detail.</p> <p>17. Simple trigonometry functions are used on right triangles. Sine, cosine, and tangent are used to solve parts of right triangles.</p> <p>24. Pythagorean Theorem is studied in great detail; distance formula is often used, along with the Law of Sines and the Law of Cosines.</p> <p><u>Correctives</u> – Assign textbook problems, constructions, and chapter review. <u>Extensions</u> – Assign advanced problems in text.</p>	<ul style="list-style-type: none"> • Teacher-made/commercial tests • Board work • Student notebooks 	<ul style="list-style-type: none"> • Textbook – <u>Geometry</u> • Various resource books • Computer software esp. CCC Program • Internet • Compass • Protractor • Ruler