

**PLANNED COURSE CURRICULUM GUIDE
ALGEBRA II**

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: 1

Course Weight: 1

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 a power, finding roots) to solve equations and inequalities.</p> <p>81. Describe domain and range of functions modeled from real life data.</p> <p>82. Represent and analyze finite graphs as relations and pictorial representations.</p>	<p>78. Simplify expressions using the order of operations and the rules for absolute value and for exponents.</p> <p>81. Determine any restrictions on the domain and range of a function.</p> <p>82. Graph quadratics and exponential functions.</p> <p><u>Correctives</u> – Individual instruction.</p> <p><u>Extensions</u> – Internet research.</p>	<ul style="list-style-type: none"> • Teacher-made/commercial tests, quizzes, and activities • Homework assignments • Oral presentations • Cooperative activities and presentations • Classroom work 	<ul style="list-style-type: none"> • Textbook • Calculators • Graph paper • Measuring devices • Computers with the Internet • Teacher resource books

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>71. Estimate using scientific notation.</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. Simplify expressions involving roots.</p> <p>71. Express values in scientific notation. Multiply and divide using scientific notation.</p> <p>72. Simplify expressions involving exponents.</p> <p>73. Solve linear and quadratic equations involving several steps.</p> <p>78. Solve and graph functions using graphing calculators.</p>	<ul style="list-style-type: none"> • Teacher-made/commercial tests, quizzes, and activities • Homework assignments • Oral presentations • Cooperative activities and presentations • Classroom work 	<ul style="list-style-type: none"> • Textbook • Calculators • Graph paper • Measuring devices • Computers with the Internet • Teacher resource books

80. Determine and explain the meaning of zeros of functions modeled from real life situations.

81. Construct and apply graphs of polynomial functions modeled from real data.

80. Find the roots of quadratic equations and relate these to real life situations.

81. Graph quadratic functions and relate them to real life situations.

Correctives – Individual instruction.

Extensions – Internet research.

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>34. Describe connections between equivalent representations and corresponding procedures of the same problem situation or mathematical concept.</p> <p>37. Demonstrate mathematical solutions to problems in the physical sciences.</p>	<p>33. Describe a systematic approach and arrive at a solution for various word problems.</p> <p>34. Compare and contrast different methods of solving the same problem.</p> <p>37. Solve word problems involving distance, velocity, and acceleration due to gravity and time.</p> <p><u>Correctives</u> – Individual instruction.</p> <p><u>Extensions</u> – Internet research.</p>	<ul style="list-style-type: none"> • Teacher-made/commercial tests, quizzes, and activities • Homework assignments • Oral presentations • Cooperative activities and presentations • Classroom work 	<ul style="list-style-type: none"> • Textbook • Calculators • Graph paper • Measuring devices • Computers with the Internet • Teacher resource books

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 formulation, 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 language.</p>	<p>33. Describe a systematic approach and arrive at a solution for various word problems.</p> <p>34. Model polynomials and their addition and subtraction, and completing the square using algebra tiles. Use these models to solve real world problems.</p> <p>35. Apply appropriate mathematical concepts and techniques to solve and create complex problems.</p> <p>36. Describe a systematic approach and arrive at a solution for various word problems. Present the process and solution both orally and in writing using correct mathematical</p>	<ul style="list-style-type: none"> • Teacher-made/commercial tests, quizzes, and activities • Homework assignments • Oral presentations • Cooperative activities and presentations • Classroom work 	<ul style="list-style-type: none"> • Textbook • Calculators • Graph paper • Measuring devices • Computers with the Internet • Teacher resource books

language and procedures.

Correctives – Individual instruction.

Extensions – Internet research.

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>57. Solve systems of equations by substitution, elimination, and graphing.</p> <p>59. Graph exponential and logarithmic functions using a graphing calculator.</p> <p>60. Solve systems of inequalities.</p> <p>61. Graph equations representing conic sections (circles, ellipses, parabolas, and hyperbolas.).</p>	<p>56. Simplify numerical and literal expressions.</p> <p>57. Solve systems of equation in two variables by graphing, addition, and substitution methods.</p> <p>59. Use a graphing calculator to graph exponential functions.</p> <p>60. Solve systems of inequalities graphically and algebraically.</p> <p>61. Use a graphing calculator to represent circles and parabolas.</p>	<ul style="list-style-type: none"> • Teacher-made/commercial tests, quizzes, and activities • Homework assignments • Oral presentations • Cooperative activities and presentations • Classroom work 	<ul style="list-style-type: none"> • Textbook • Calculators • Graph paper • Measuring devices • Computers with the Internet • Teacher resource books

<p>66. Formulate expressions, equations, inequalities, systems of equations, and systems of inequalities to model routine and non-routine problem situations.</p> <p>67. Use equations to represent curves such as circles, ellipses, parabolas, and hyperbolas.</p> <p>68. Identify whether systems of equations and inequalities are consistent or inconsistent.</p> <p>69. Solve linear, quadratic, and/or exponential equations both symbolically and graphically.</p> <p>70. Determine the domain and range of a relation, given a graph or set of ordered pairs.</p> <p>71. Represent functional relationships in tables, charts, and graphs.</p> <p>76. Create, write, and solve real-life problems that demonstrate an understanding of appropriate function models.</p>	<p>66. Solve various word problems by writing equations, systems of equations, inequalities, and systems of inequalities.</p> <p>67. Represent lines with equations.</p> <p>68. Determine if a system of equations or inequalities is consistent or inconsistent, dependent or independent, by graphing and algebraically.</p> <p>69. Solve linear and quadratic equations algebraically and graphically.</p> <p>70. Determine the domain and range of a relation from a graph or set of points.</p> <p>71. Represent functions in tables, charts, and graphs.</p> <p>76. Solve systems of equations to identify solutions to real-life problems (e.g., tailwind/headwind, coin mixtures, cost analysis, etc.).</p> <p><u>Correctives</u> – Individual instruction. <u>Extensions</u> – Internet use.</p>		
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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 #11: All students understand, demonstrate, and apply basic concepts of calculus 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 11</p> <p>42. Graph and interpret rates of growth/decay.</p> <p>44. Describe the meaning of maximum or minimum values of a function and how it applies to a real life situation.</p>	<p>42. Use a graphing calculator to graph and interpret rates of growth/decay.</p> <p>44. Find the maximum or minimum value of a parabola and relate the value to a real life situation.</p> <p><u>Correctives</u> – Individual instruction. <u>Extensions</u> – Internet use.</p>	<ul style="list-style-type: none"> • Teacher-made/commercial tests, quizzes, and activities • Homework assignments • Oral presentations • Cooperative activities and presentations • Classroom work 	<ul style="list-style-type: none"> • Textbook • Calculators • Graph paper • Measuring devices • Computers with the Internet • Teacher resource books