



Apogee Program Session 1 Course Title: Pre-Algebra

Course Description

What does it mean to solve for x ? Why do we care about balanced equations? Pre-Algebra offers an innovative approach to the study of introductory algebraic skills in an environment that provides for both self-paced and cooperative learning. This course builds upon the essential skills of arithmetic as they apply to algebra, and is designed for math-minded students who enjoy working in teams and learning new techniques to solve math problems. Pre-Algebra solidifies students' understanding of math concepts necessary for success in algebra.

You may ask, *when will I ever use algebra?* With an introduction to pre-algebra, you will focus on developing your math problem-solving ability in the world and how it relates to real-life experiences. In addition to tackling concepts of linear equations and polynomial functions, expand your thinking through intuitive and inductive reasoning, mathematical discovery, reasoning skill, and insight. The text we will be using focuses on problem solving, critical thinking, and continual review of key concepts.

Essential Questions

- How can learning pre-algebra concepts broaden your understanding of the world?
- What strategies and methods can you use to solve and apply mathematical concepts in real contexts?
- How do mathematical formulas help us to be more efficient problem solvers?

Outcomes

- Upon successful completion of this course, students will:
- Discuss and engage in algebraic thinking and modeling through a series of mathematical problems;
- Develop and solve contextualized problems using visual representations, such as graphs, tables, equations, and hands-on manipulatives;
- Use mathematical properties to solve, check, and simplify algebraic expressions and equations;
- Demonstrate problem-solving skills to work through a range of mathematical problems to find solutions;
- Explain and apply specific pre-algebra concepts and formulas in real-life contexts.

Instructional Strategies

In order to deepen students' understanding of mathematical skills and content, a variety of

techniques and strategies will be utilized through the use of varied and appropriate activities designed to meet individual student needs. Students will cover a broad range of content through the implementation of differentiated strategies that include flexible grouping, curriculum compacting, tiered assignments, anchoring activities, independent study, and peer teaching as a means to improve and guide student learning. In grouping for learning, students will have opportunities to learn and work in cooperative groups based on student interest, level of readiness, and learning style. Designed to meet the needs of high-ability students, compacting the curriculum will also streamline the coursework to a pace that corresponds with the students' ability to keep them challenged and actively involved in learning. With ongoing student assessment of students' knowledge, skills, and attitude, alternative activities may be provided for those that have already mastered curriculum content. While knowing the ability range of students, assignments or activities may be tiered and adjusted with appropriately challenging tasks.

In addition to, students will be provided self-paced, purposeful, content-driven activities that students can work on independently, in pairs, or groups throughout a unit. They will be provided with meaningful, ongoing list of activities related to a specific topic being covered. These activities may relate to specific needs or enrichment opportunities, including problems to solve or journals to write. These strategies will be used in a variety of ways to offer different approaches to what students learn, how they learn it, and how they demonstrate what they've learned in this course.

Resources and Materials

- **Books**

- Larson, Ron. Pre-Algebra. McDougal Littell, 2005.
- Sherwood, Walter. Real-Life Math Algebra ISBN: 0825138094
- Thompson, Frances M. Hands-On Algebra ISBN: 0876283865

- **Materials**

Spiral, binder/folder, pencils, scissors/glue, coloring supplies, calculator (should be able to perform basic algebraic functions).

Student Assessment

- **Pre-Assessment**

Students will be given a pre-assessment on the first day to assess their prior knowledge and background of basic mathematical concepts.

- **Documentation of Learning**

Although course grades are not assigned to those students taking enrichment classes, the evaluation process is still an important component of this course. There will be formal and informal assessments provided to gauge student understanding and progress. Students will be given daily homework assignments and activities or projects to measure individual growth and learning. Homework assignments are given and assessed, and students will also be formally assessed with a pre-test, midterm, and a final exam. Active participation, teacher observations, work completion, and student effort will also be monitored on a daily basis. Additionally, the use of questioning and informal discussions will focus on student thinking and reasoning to help monitor his or her progress.

- **Post-Assessment**

Students will complete a final exam to assess their knowledge base of the curriculum content of the course. Students will also participate in a culminating activity to present what they have learned for *Expo!* that will take place on the last day of class. At the conclusion of the course, a written evaluation will be distributed for each student.

Schedule

Date(s)	Topic(s)	In-class Activities	Assignment/Assessments
M 6/27	Variable Expressions Powers and Exponents Order of Operations Integers Coordinate Plane	Pre-Test Ice Breakers Bingo Coordinate Plane Graphing Activity	Pre-Test Journal/Textbook Assignment Whole and/or small group discussion
T 6/28	Distributive Property and Like Terms Simplify Expressions Solving Algebraic Equations	Logic Puzzles Dominoes Review	Midterm Whole and/or Small Group Discussion
T 7/5	Angle Relationships Angles and Parallel Lines Rotation, Reflection, and Translation	Drawing Angles Transformation Quilt Investigating the Properties of Quadrilaterals	Transformation Quilt Journal
W 7/6	Probability Data Analysis and Graphing	Statistics Create a Graph (lab)	Journal/Textbook Assignment Whole and/or small group discussion
Th 7/7	Cumulative Review	Review Game	Journal/Textbook Assignment Whole and/or small group discussion

F7/8	Final Exam	Final Exam	Final Exam Journal
M 7/11	Critical Thinking Activity	Journal/Textbook Assignment Whole and/or small group discussion	
T 7/12	Solving Two-Step and Multi-Step Equations Solving and Graphing Inequalities	Graphing on Number Lines Word Problems	Journal/Textbook Assignment Whole and/or small group discussion
W 7/13	Factors and Prime Factorization Greatest Common Factor, Least Common Multiple Rules of Exponents Negative and Zero Exponents	Factor Game Math Station Activity Connected Math	Journal/Textbook Assignment Whole and/or small group discussion
TH 7/14	Percents, Decimals, and Fractions Ratios and Rates Solving Percent Equations Problem Solving with Proportions	Restaurant and Percent Sale Activity Budgeting Project (lab)	Journal/Textbook Assignment Whole and/or small group discussion
F 7/15	Relations and Functions Linear Equations in Two Variables Slope and Intercepts Class Reflections	Prepare for Expo!	Portfolios

	Wrap up		
--	---------	--	--

CTD Statement on Third-Party Web Sites

Instructors are required to thoroughly review any third-party web sites they intend to use in their courses for inappropriate content. However, because web content continuously changes, CTD disclaims any responsibility for any of the content contained on third-party web sites used in course materials. If you become aware of anything that may be inappropriate, please notify CTD staff immediately.

SAMPLE