Course Outline

Course Title: Algebra 2
Instructor: Mr. Alei Room 201
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MYP Level 4 & 5
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Course Description: Algebra 2 is an introduction to the primary functions used by scientists, engineers and mathematicians to solve problems. Particular stress is put on modeling real-world situations and using mathematical techniques to find solutions to problems. Students will understand which functions are appropriate in a variety of situations, and be able to build a function to model a situation, determine the appropriateness of the model and determine important aspects of the model. The course prepares the student for IB Standard Level mathematics by meeting the requirements of Desert Academy's Middle Years IB Program (MYP) and most of the New Mexico state standards for Algebra 2. The course objectives as identified by MYP are given below along side the corresponding New Mexico state math standards.

MYP Objectives	NM State Standards
Knowledge and understanding: Students should be able to: • Know and demonstrate understanding of the concepts from the five branches of mathematics (number, algebra, geometry and trigonometry, statistics and probability, and discrete mathematics) • Use appropriate mathematical concepts and skills to solve problems in both familiar and unfamiliar situations, including those in real-life contexts • Select and apply general rules correctly to solve problems, including those in real-life contexts.	**Content Standards:** • Know and demonstrate understanding of the concepts from three major strands of mathematics (Algebra, Functions & Graphs, Geometry & Trigonometry, Data Analysis and Probability) **Process Standard: Problem Solving** • Solve problems that arise in mathematics and other contexts • Build new mathematical knowledge through problem solving • Apply and adapt a variety of appropriate strategies to solve problems • Monitor and reflect on the process of problem solving.
Investigating patterns: Students should be able to: • Select and apply appropriate inquiry and mathematical problem-solving techniques • Recognize patterns • Describe patterns as general rules or relationships • Draw conclusions based on findings • Justify or prove general rules and mathematical relationships.	**Process Standard: Reasoning and Proof** • Recognize reasoning and proof as fundamental aspects of mathematics, • Make and investigate mathematical conjectures, • Develop and evaluate mathematical arguments and proofs • Select and use various types of reasoning and methods of proof.
Communication in mathematics: Students should be able to: • Use appropriate mathematical language (notation, symbols, terminology) in both oral and written explanations • Use different forms of mathematical representation (formulae, diagrams, tables, charts, graphs and models) • Communicate a complete and coherent mathematical line of reasoning using different forms of representation when investigating complex problems.	**Process Standard: Communication** • Organize and consolidate thinking through communication, • Communicate their mathematical thinking coherently and clearly to peers, teachers, and others, • Analyze and evaluate the thinking and strategies of others, • Use the language of mathematics to express ideas precisely • Describe mathematical concepts using developmentally appropriate definitions. **Process Standard: Representation** • Create and use representations to organize, record, and communicate mathematical ideas, • Select, apply, and translate among mathematical representations to solve problems, and • Use representations to model and interpret physical, social, and mathematical phenomena.
Reflection in mathematics: Students should be able to: • Explain whether their results make sense in the context of the problem • Explain the importance of their findings • Justify the degree of accuracy of their results where appropriate • Suggest improvements to the method when necessary	**Process Standard: Connections** • Recognize and use connections among mathematical ideas, • Understand how mathematical ideas interconnect and build on one another to produce a coherent whole, and • Recognize and apply mathematics in contexts outside of mathematics.

Course Aims: The aims of teaching and learning mathematics are to encourage and enable students to:

- Recognize that mathematics permeates the world around us
- Enjoy mathematics and develop patience and persistence when solving problems
- Understand and be able to use the language, symbols and notation of mathematics
- Develop mathematical curiosity and use inductive and deductive reasoning when solving problems
- Become confident in using mathematics to analyze and solve problems both in school and in real-life situations
- Develop the knowledge, skills and attitudes necessary to pursue further studies in mathematics
- Develop abstract, logical and critical thinking and the ability to reflect critically upon their work and the work of others
- Appreciate the international dimension of mathematics and its multicultural and historical perspectives

Text: Larson, Boswell, Kanold, Stiff: (*Algebra 2, McDougal Littell, 2007 Edition*). The text will be provided. An online version is available at http://www.classzone.com/cz/books/algebra_2_2007_na/. To use the online text you will need to create an account and supply the Access Code 5916725-70.

Areas of Interaction

- **Approaches to Learning**: Students will learn through reading, discussion, lectures, projects, and presenting problems, both as individuals and in groups. They will be asked to reflect on their strengths and weaknesses in each approach.
- **Community and Service**: Students will explore linear programming as it applies to real world decision making such as optimizing the allocation of natural resources to meet various social needs.
- **Health and Social Education**: Students will look at the role of statistics and probability in predicting the outcome of elections, the spread of disease, etc.
- **Environments**: Students will explore mathematical models of growth and decay and consider how they can be used to help predict our future environment.
- **Human Ingenuity**: Students will explore the mathematics behind predicting when an object in motion will hit the ground, and how seemingly unrelated mathematical ideas she light on each other.

Methodology: The course includes the following units of study. As time permits we will work on other lessons in an effort to cover all the MYP and New Mexico state standards.

MYP Unit	Textbook Topic	Ch
Unit 0 – Skills Review	Equations and Inequalities	**1**
Unit 1 – Question: What's the purpose of creating mathematical models?	Linear Equations and Functions	**2**
Unit 2 – Question: How can we use mathematics to solve complicated, real-world problems?	Linear Systems and Matrices	**3**
Unit 3 – Question: How can algebraic expressions model shapes and situations in the real world?	Quadratic Functions and Factoring	**4**
Unit 4 – Question: How does understanding polynomials lead to a more thorough understanding of the integers?	Polynomials and Polynomial Functions	**5**
Unit 5 – Question: How does the rapid growth of human population affect the world and what can we do to mitigate these effects?	Rational Exponents & Radical Functions	**6**
	Exponential and Logarithmic Functions	**7**
Unit 6 – Question: How confident can we be about a decision when faced with incomplete data and an uncertain future?	Counting Methods and Probability	**10**

Methods of Assessment: Students will be assessed using both summative and formative assessments in all 4 MYP areas – Knowledge & Understanding, Investigating Patterns, Communication, and Reflection. Tests, quizzes, projects and regular oral and written problem presentations will be assessed.

Mandatory Assignments: Students are required to complete the semester and final exams and may miss no more than two unit tests in order to receive credit for the course.

Late work policy: It is expected that assignments will be completed, turned in on time, and represent the student's own work. Timely completion of assignments is essential to ensuring strong class participation and optimal learning outcomes. Late assignments will be subject to the following policy: Non-mandatory course assignments must be turned no later than the end of the Unit with which they are associated. Absent extenuating circumstances, these late assignments may be marked down one to two letter grades. Mandatory assignments must be turned in within the Semester that they were assigned. Failure to turn in a mandatory course assignment within this time period results in the issuing of an incomplete

and no credit for the course. Students have six weeks to convert an incomplete to a grade. Absent extenuating circumstances, these late assignments may be marked down by one to two letter grades.

Grading Policy: Your grade will be based on problem presentations, quizzes, and tests as follows:

- Problem presentations – 40% (includes HW spot checks for completion, and regular hand-in problems)
- Classwork – 10% (assessed through performance and participation in classroom activities)
- Quizzes – 20%
- Tests – 30% (Semester and Final Exams will carry twice the weight of a regular test.)

Process: We will primarily rely on instructor led discussion of concepts, followed by in class practice and extended practice as homework. Students are expected to participate fully in the discussion and to do the homework and classwork to the best of their ability. There will be a strong emphasis on communicating mathematical ideas clearly both orally and in writing. On most block days, students will be expected to arrive to class and immediately select a problem from the previous homework assignment, go a whiteboard, and write up a clear explanation of the problem. About 5-10 minutes into the class, we will sit down and students will explain their problem, one at a time, as other students discuss and clarify questions or issues that arise. Students may be asked to present more than one problem. **Every student should be prepared to present at least one problem per class period**. Most tests, quizzes, and in class project work will be done on Fridays.

Homework Policy: Because math is best learned through regular practice, expect to have nightly homework. Unless otherwise indicated, homework is due at the beginning of the following class period. In most cases, you will be presenting one or more homework problems during class. The remaining problems will be spot checked for completion and collected on a random basis for explicit grading. Be prepared to hand in any homework assignment.

Absences and Tardies: Please refer to the school's absentee and tardy policies in the 2011-12 Parent Student Handbook. Note that as students arrive to class, they will select the problem(s) they wish to present on a first come, first served basis so it is to your advantage to arrive to class on time. If you are absent, you are responsible for making up the missed material on your own time. In general missed HW is due one day following your return from an absence. It is your responsibility to schedule a time to make up missed tests or quizzes.

Required Materials: Students are expected to bring the following materials to class **every day**.

- Text book (if class sets are not available)
- Math notebook. I **strongly** suggest a graph paper notebook, available at Staples for about $3
- 3 Ring binder to help organize handouts and submitted work that has been returned to you.
- Graphing calculator (TI-84Plus recommended, TI-89 if you intend to get an IB Certificate)
- At least two pencils with good erasers.
- There is generally a class set of rulers, protractors, compasses, etc, but having your own is nice.

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Student Name (please print) Parent Name (please print)

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Student Signature Parent Signature Date