

IB MYP Course Outline

Course Title: MYP Introductory Algebra Level 4

School Year: 2017-2018

School: Pueblo East High School

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I. Course Description:

a. MYP Fundamental Concepts

The aim of all IB programmes is to develop internationally minded people who, recognizing their common humanity and shared guardianship of the planet, help to create a better and more peaceful world. Student learning is guided by a focus on holistic learning through units that are guided by the MYP areas of interaction. Units in the course will also be written with a focus on intercultural awareness, open and effective communication, and international mindedness.

b. Learner Profile Attributes

Students in this course will be encouraged to develop the attributes of the IB Learner Profile through various activities including collaboration, inquiry based lessons and reflection. IB Learners strive to be inquirers, knowledgeable, thinkers, communicators, principled, open-minded, caring, risk-takers, balanced, and reflective. During each unit, students will focus on developing one or two attributes of the Learner Profile. .

II. MYP Aims and Objectives/Common Core State Standards/Colorado Academic Standards

Aims:

The aims of the teaching and study of MYP mathematics are to encourage and enable students to:

- enjoy mathematics and to develop curiosity as well as an appreciation of its elegance and power
- develop an understanding of the principles and nature of mathematics
- communicate clearly and confidently in a variety of contexts
- develop logical, critical and creative thinking, and patience and persistence in problem solving
- develop power of generalization and abstraction
- apply and transfer skills to a wide range of situations including real life, other areas of knowledge and future developments
- appreciate how developments in technology and mathematics have influenced each other
- appreciate the moral, social and ethical implications arising from the work of mathematicians and the applications of mathematics
- appreciate the international dimension in mathematics through an awareness of the universality of mathematics and its multicultural and historical perspectives
- appreciate the contribution of mathematics to other areas of knowledge
- develop the knowledge, skills and attitudes necessary to pursue further studies in mathematics
- develop the ability to reflect critically upon their own work and the work of others.

MYP Objectives:

A. Knowledge and understanding

Knowledge and understanding are fundamental to studying mathematics and form the base from which to explore concepts and develop problem-solving skills. Through knowledge and understanding, students develop mathematical

CCSS (or CAS):

CCSS: HS: Algebra, Seeing Structure in Expressions
 CCSS: HS: Functions, Interpreting Functions
 CCSS: HS: Functions, Building Functions
 CCSS: HS: Functions, Linear, Quadratic, and Exponential Models
 CCSS: HS: Algebra, Reasoning with Equations & Inequalities

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reasoning to make deductions and solve problems.

At the end of the course, students should be able to:

- i. select appropriate mathematics when solving problems in both familiar and unfamiliar situations
- ii. apply the selected mathematics successfully when solving problems
- iii. solve problems correctly in a variety of contexts.

B. Investigating patterns

Investigating patterns allows students to experience the excitement and satisfaction of mathematical discovery. Working through investigations encourages students to become risk-takers, inquirers and critical thinkers. The ability to inquire is invaluable in the MYP and contributes to lifelong learning.

At the end of the course, students should be able to:

- i. select and apply mathematical problem-solving techniques to discover complex patterns
- ii. describe patterns as general rules consistent with findings
- iii. prove, or verify and justify, general rules.

C. Communicating

Mathematics provides a powerful and universal language. Students are expected to use appropriate mathematical language and different forms of representation when communicating mathematical ideas, reasoning and findings, both orally and in writing.

At the end of the course, students should be able to:

- i. use appropriate mathematical language (notation, symbols and terminology) in both oral and written explanations
- ii. use appropriate forms of mathematical representation to present information
- iii. move between different forms of mathematical representation

CCSS: HS: Num/Quantity, The Complex Number System

CCSS: HS: Geometry, Expressing Geometric Properties with Equations

CCSS: HS: Geometry, Expressing Geometric Properties with Equations

CCSS: HS: Algebra, Arithmetic with Polynomials & Rational Functions

CCSS: HS: Algebra, Creating Equations

CCSS: HS: Stats/Prob, Conditional Probability & the Rules of Probability

CCSS: HS: Stats/Prob, Using Probability to Make Decisions

CCSS: HS: Functions, Trigonometric Functions

CCSS: HS: Stats/Prob, Interpreting Categorical & Quantitative Data

CCSS: HS: Stats/Prob, Making Inferences & Justifying Conclusions

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- iv. communicate complete, coherent and concise mathematical lines of reasoning
- v. organize information using a logical structure.

D. Applying mathematics in real-life contexts

MYP mathematics encourages students to see mathematics as a tool for solving problems in an authentic real-life context. Students are expected to transfer theoretical mathematical knowledge into real-world situations and apply appropriate problem-solving strategies, draw valid conclusions and reflect upon their results.

At the end of the course, students should be able to:

- i. identify relevant elements of authentic real-life situations
- ii. select appropriate mathematical strategies when solving authentic real-life situations
- iii. apply the selected mathematical strategies successfully to reach a solution
- iv. justify the degree of accuracy of a solution
- v. justify whether a solution makes sense in the context of the authentic real-life situation.

III. Global Contexts

Global contexts direct learning towards independent and shared inquiry into our common humanity and shared guardianship of the planet. Using the world as the broadest context for learning, MYP mathematics can develop meaningful explorations of: identities and relationships, orientation in space and time, personal and cultural expression, scientific and technical innovation, globalization and sustainability, and fairness and development. Each unit will be written with a selected global context. Inquiring into subject content through a global context enables students to develop a deeper understanding of both mathematics and its application in the real world. Repeated cycles of inquiry, action and reflection can lead students from academic knowledge towards practical understanding, developing positive attitudes towards learning as well as a sense of personal and social responsibility.

IV. MYP Unit Sequence and Duration

Unit Sequence	Duration
Statistical Measures and Data Analysis: Students will build upon previous skills related to center and spread of a data distribution. Students will now compare two or more different data sets using the center spread of each, and interpret any differences in context.	Approximately 3 weeks

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<p>Linear Equations: Students will build upon previous skills where they learned to solve simple linear equations in one variable. Students will master and analyze solution process, using algebraic properties and inverse operations to justify solution steps. Students will become fluent in writing and interpreting linear equations in various problem situations.</p>	Approximately 3 weeks
<p>Inequalities: Students will use scale and tools to model and solve problems. Working with units and the relationships between them will provide a foundation for the study of expressions, equations and functions in later chapters. As with equations, students will create and use inequalities to solve problems in contextual situations.</p>	Approximately 3 weeks
<p>Functions: Students have previously defined and evaluated functions, and use them to model relationships. Students will now graph functions and interpret the graphs in terms of the quantities related by the function. Students will sketch graphs based on verbal descriptions of the relationship between quantities.</p>	Approximately 4 weeks
<p>Linear Functions: Students will focus on the rates of change, or slopes, of linear functions. They will learn that a linear function has a constant rate of change. They will calculate slopes from graphs, tables and equations of linear functions.</p>	Approximately 4 weeks
<p>Exponents and Polynomials: Students have previously studied integer exponents and radicals. Students will now expand this concept to rational (fractional) exponents and connect rational exponents to radicals. Students will build on these skills later when they study exponential functions</p>	Approximately 3 weeks
<p>Factoring Polynomials: Students will become fluent in factoring procedures and foster conceptual understanding. Students will explore connections between factoring polynomials and factoring integers. Understanding what different forms of an expression reveal guides the process of problem solving.</p>	Approximately 3 weeks

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<p>Systems of Equations and Inequalities: Students have previously learned that the relationships between two or more variables can be represented as an equation or inequality and as a graph. Students will learn how to use a graph to solve systems of equations.</p>	Approximately 4 weeks
<p>Quadratic Functions and Equations: Students will learn the characteristics of quadratic functions with an emphasis on the parabolic shape of their graphs. They will apply this knowledge in real-world situations involving projectile motion.</p>	Approximately 5 weeks
<p>Exponential Equations and Functions: Students will compare and contrast with linear functions, distinguishing between additive and multiplicative change. When given a contextual situation, students will use their previously acquired knowledge of linear and exponential functions to determine whether the situation in question has a linear pattern of change or an exponential pattern of change.</p>	Approximately 4 weeks

NOTE: *The sequence and coverage of the material in this class may vary due to the nature of this introductory course.*

V. Methods of Assessment

Assessment tasks in this class will include formative and summative assessments.

Formative assessments will include but not be limited to: observation, checks for understanding, daily practice lessons, quizzes, and investigations.

Summative assessments will include but not be limited to: selected response exams, open-ended tasks, performance tasks, projects, investigations, and written works.

For each scored assessment given, students will receive a task oriented rubric that will be used to determine the students' level of understanding and/or achievement based on the MYP Criteria which follows.

Assessment for mathematics courses in all years programme is criterion-related, based on four equally weighted assessment criteria that match the course objectives:

Criterion A: Knowing and understanding

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Criterion B: Investigating patterns

Criterion C: Communicating

Criterion D: Applying mathematics in real-life contexts

Each of these criterion will be assessed at least twice over the course of the school year.

VI. Texts and Resources

Mathematics Navigator Series, America's Choice

Interactive Mathematics Program, Key Curriculum Press

Additional Supplementary Resources as deemed appropriate

VII. Other Course Components

Grading Scale and Policies

90-100% = A

80-89% = B

70-79% = C

60-69% = D

Below 60% = F

Student's grades will be weighted as follows:

Summative Tasks = 60%

Formative Tasks = 40%

This is an interactive course. Class discussions and student presentations will enable us to explore various methods in problem solving and the reasons they work. Whole group instruction as well as small group investigation will be used regularly with the expectation that all students will participate equally.

BEHAVIOR: Students are expected to follow the two classroom rules which are Be Respectful and Be Responsible.

Respect is expected at all times for the instructor, substitute instructor, all students and their ideas. Please refer to the Pueblo City Schools Student Conduct Code.

Students are also expected to be responsible for their own learning and academic success. Students should turn in work in a timely manner, be responsible for any material missed due to an absence, be an active participant in daily learning, and should ask questions when they need clarification or assistance.

In general students should ensure that all behaviors in class promote their own learning and do not interfere with the learning of others.

Academic Honesty is expected of all students. For additional information on Academic Honesty, please

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refer to the Academic Honesty Policy.

CHEATING OF ANY KIND WILL NOT BE TOLERATED AND WILL RESULT IN A GRADE OF ZERO AND LOSS OF CHANCE TO RE-TEST/SUBMIT.

CELL PHONES will NOT be permitted for use during class time. According to research, “heavier smartphone use has been linked to lower-quality sleep and lower GPAs” and “more than 75 percent of students reported texting while in class, and in-class texting was linked to an average drop of half a letter grade or more.” Therefore, students will not be allowed to be on cellphones during class time unless specifically instructed by the teacher for a learning activity. Parents needing to reach their students in the event of an emergency during class may do so by calling the main office at 549-7222. Thank you for your support of this effort and your cooperation in not texting or phoning your student during class time.

CONSEQUENCES FOR CELL PHONE USE PER EVENT FOLLOW:

These consequences are for the whole semester. Students will not get multiple warnings in a semester.

1st Incident: Verbal warning to student, and the student will put the phone away

2nd Incident: After school detention and parent phone call

3rd Incident: Security will be called to remove the phone

All other incidents: Behavior referral for defiance

ATTENDANCE AND TARDIES

Attendance is required. There is a direct correlation between high student achievement and good attendance.

Absences: Please refer to the East High School Handbook for school policy regarding absences from school. Extended absences will be reviewed on an individual basis. In the case of an excused absence on a test day, the student must take the missing test the day of return to school. Make-up work will only be allowed for excused absences.

Tardies: Students are expected to be in their seat when the tardy bell rings. Please see the student handbook for the specific guidelines.