CKSTEM 2025-2026 CURRICULUM

MATH PROBLEM SOLVING (MPS) GRADES 3-8

UNIT	TOPIC	G3	G4	G5	G6	G7	G8
Algebra	Fraction	✓	✓	✓	✓	✓	✓
Algebra	Decimals		✓	✓	✓	✓	✓
Algebra	Percantage			✓	✓	✓	✓
Algebra	Algebraic Expression	✓	✓	✓	✓	✓	✓
Algebra	Rational Numbers				✓	✓	✓
Algebra	Financial Literacy (taxes, profit, interest)	✓	✓	✓	✓	✓	✓
Algebra	Sequence & Series			✓	✓	✓	✓
Algebra	Algebraic Equations			✓	✓	✓	✓
Algebra	Statistics (Data Analysis & Management)		✓	✓	✓	✓	✓
Algebra	Inequalities	✓	✓	✓	✓	✓	✓
Algebra	Irrational Numbers						✓
Combinatorics	Counting Rectangles	✓	✓	✓	✓		
Combinatorics	Counting Triangles	✓	✓	✓			
Combinatorics	Number Combinations	✓	✓	✓			
Combinatorics	Counting Paths	✓	✓	✓	✓	✓	
Combinatorics	Permutations & Combinations				✓	✓	✓
Combinatorics	Drawing Random Numbers	✓	✓	✓	✓		
Combinatorics	Pigeonhole Principle				✓	✓	✓
Geometry	Length, Perimeter & Area	✓	✓	✓			
Geometry	Polygons - Faces, Edges & Vertices	✓	✓	✓			
Geometry	Triangles				✓	✓	✓
Geometry	Angles			✓	✓	✓	✓
Geometry	Quadrilaterals				✓	✓	✓
Geometry	Circles					✓	✓
Geometry	3D - Surface Area & Volume				✓	✓	✓
Geometry	3D Visualization	✓	✓	✓			
Geometry	Analytic Geometry				✓	✓	✓
Logical Reasoning	Chickens & Rabbits	✓	✓	✓	✓	✓	
Logical Reasoning	Age Problems	✓	✓	✓	✓		
Logical Reasoning	Ratios & Rates	✓	✓	✓	✓	✓	✓
Logical Reasoning	Calendar Problems	✓	✓	✓			
Logical Reasoning	Patterns	✓	✓	✓			
Logical Reasoning	Speed, Distance & Time			✓	✓	✓	✓
Logical Reasoning	Optimization			✓	✓	✓	✓
Number Theory	Number Sense/Divisibility	✓	✓	✓	✓	✓	✓
Number Theory	Multiples	✓	✓	✓			
Number Theory	Prime Factoring (including LCM/GCD)		✓	✓	✓	✓	✓
Number Theory	Modular Arithmetic	✓	✓	✓	✓	✓	✓
Number Theory	Exponents			✓	✓	✓	✓
Number Theory	NT Problem Solving (word problems)	✓	✓	✓	✓	✓	✓
Number Theory	Cryptarithmetic	✓	✓	✓			
Problem Solving Techniques	Interval & Gaps	✓	✓	✓			
Problem Solving Techniques	Order of Operations		✓	✓	✓		
Problem Solving Techniques	Working Backward	✓	✓	✓	✓		
Problem Solving Techniques	Application of Gauss's Discovery		✓	✓	✓	✓	
Problem Solving Techniques	Venn Diagram			✓	✓	✓	✓
Problem Solving Techniques	Fibonacci Numbers	✓	✓	✓			
Problem Solving Techniques	Excess-and-Shortage Problems	✓	✓	✓	✓	✓	

*** MSE course will have mixed content from MPS 6-8. Please complete the assessment test fro MSE before enrolling for the class.*

** Each session will be 75 minutes long. We will try our best to cover these extra topics. We may do extra classes beyond the 35 scheduled classes (September 2025 to June 2026).*

HIGH SCHOOL MATH PROBLEM SOLVING (L1)

UNIT	TOPIC
Algebra	• Algebraic Identities and Algebraic Manipulations • Factorizations and More Algebraic Manipulations • Rational Expressions and Partial Fractions Decomposition. • Telescopic Sums and Products • Equations. Systems of Equations. • Functions. Functions Transformations. • Radical Functions. • Polynomial Functions. Characteristics of Polynomial Functions. • Polynomial Functions. The Remainder Theorem. The Factor Theorem. • Polynomial Functions. Equations and Graphs of Polynomial Functions. • Exponents and Logarithms. • Exponential functions. Transformations of Exponential Functions. • Exponential Equations. • Logarithms : introduction. • Logarithmic Functions. Transformations of Logarithmic Functions. • Logarithmic and Exponential Equations. • Rational Functions. Introduction. • Rational Functions. Connecting Graphs and Rational Equations. • Functions Operations. Sums and Differences of Functions. Products and • Quotients of Functions. • Composite Functions.
Geometry	• Congruent and similar triangles. • Area and Area Method. • Circle. Geometric Approach. • Circle Computation. • Cyclic Quadrilaterals. • Trigonometry : trigonometric circle, properties, functions sine and cosine, properties and basic identities. • Trigonometric Identities. • Introduction to Trigonometric Equations. • Geometric problems solved with trigonometric methods. The law of sines and the law of cosines. • Coordinates Geometry (1) • Coordinates Geometry (2)
Counting and Combinatorics	• Counting Methods : permutations, arrangements and combinaisons. • The Binomial Theorem.
Number Theory	• Divisibility. Number and sum of divisors. • Modular arithmetic.

** Each session will be 1.5 hours long. Actual topics may vary slightly based on interest and needs of students. We may do some extra classes beyond the 35 scheduled classes (September 2025 to June 2026).*
** This course is aligned with advanced high school math topics which are essential for achieving high grades in High School.*
** Program will also focus on preparing students for the global contests such as AMC 10, TIMO, BBB, HKIMO etc.*

HIGH SCHOOL MATH PROBLEM SOLVING (L2)

UNIT	TOPIC
Algebra	• Algebraic Manipulations. Advanced Techniques. • Introduction to inequalities. AM-GM Inequality. Cauchy-Schwarz Inequality. • Polynomials. Vieta's Formulas. Newton's Sums. • Polynomials. Review Problems. Past AMC and AIME problems. • Functions. Injective, surjective and bijective functions. Functions compositions. • Introduction to functional equations. • Exponent and Logarithm Functions. • Sequences. Recursions. • Arithmetic and Geoemtric Sequences. • Complex Numbers. Algebraic Form. • Complex Numbers. Trigonometric Form. • Algebraic Trigonometr
Counting and Combinatorics	• Review of Counting and Probability Basics • Sets and Logic • The Pigeonhole Principle • PIE • Constructive Counting and 1-1 Correspondances • Constructive Expectation • Distributions • Mathematical Induction • Recursion • Conditional Probability • Events with States. • Tables and Chess Boards. • Challenge Problems.
Geometry	• Area and Area Method. • Trigonometric Ratios in a Right Triangle. Trigonometric Methods in Geometry. • Geometric Trigonometry. Stewart Relation. Pappus's Theorem. • Cyclic Quadrilaterals. • Circle Computations. Descartes's Formula. • Important Circles in a Triangle. The Nine Point Circle. • Power of a Point. • Radical Axis. • Mass Points (2 sessions) • Coordinates geometry
Number Theory	• Prime Numbers. GCD. Bézout's Lemma. The Euclidean Algorithm. • Gauss's Lemma. • Primes and fondamental theorem of arithmetic. • A theorem of Legendre and some of its applications. • Bertrand's Postulate. • Modular Arithmetic. • Chinese Remainder Theoerm. • Linear Dipohantine Equations. • Nonlinear Diophantine Equations. • Functions. Arithmetic Functions. • Euler's Totient Fonction. • Fermat, Euler and Wilson's Theorems. • p-adic Valuation.

** Each session will be 2 hours long. Actual topics may vary slightly based on interest and needs of students. We may do some extra classes beyond the 35 scheduled classes (September 2025 to June 2026).*
** This is an advanced math program focused on preparing students for AMC 10 and AIME. It is expected that students already have strong foundation in math to enjoy the course.*
** Program will also focus on preparing students for the global contests such as CIMC, TIMO, BBB, HKIMO etc.*
** Please complete the assessment test before enrolling for the class.*

ENGLISH LANGUAGE & COMMUNICATION 1 & 2

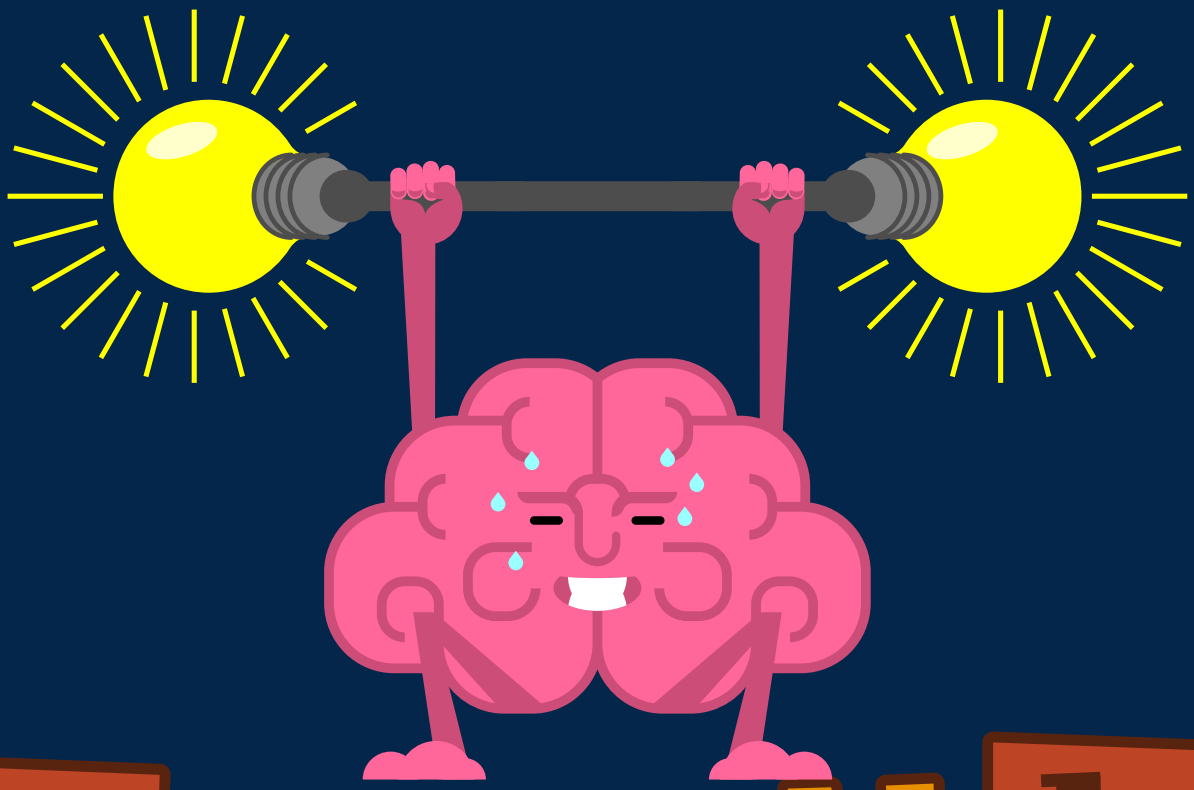
CATEGORY	UNIT	TOPIC	G4	G5	G6
Syntax & Sentence	Sentences	Subject-Predicate	✓	✓	
Syntax & Sentence	Sentences	Clauses, types & structure of sentences		✓	✓
Syntax & Sentence	Sentences	Sentence fragments and run on sentences			✓
Grammar	Parts of Speech (Basic)	Noun, Pronouns, Verbs, Adjectives & Adverbs	✓	✓	✓
Grammar	Parts of Speech (Adv.)	Gerunds, Tenses, Active-Passive, Adjective degrees etc.			✓
Grammar	Other Parts of Speech	Appositives & appositive Phrases		✓	✓
Reading	Reading Strategy	Accuracy & Fluency reading strategies	✓	✓	
Reading	Comprehension Strategy	Review & Summarize, Predictions, Facts & Opinions	✓	✓	✓
Reading	Comprehension Strategy	Inferences & Conclusions, Visualizing, Fact & Judgement		✓	✓
Reading	Comp. Techniques	Main Idea, Finding Details & Context Clues	✓		
Reading	Comp. Techniques	Compare & Contrast, Cause & Effect, Sequencing		✓	✓
Reading	Literary Genres	Prose, Poetry & Drama			✓
Verbal Reasoning	Vocabulary	Definition, Synonyms & Antonyms	✓	✓	
Verbal Reasoning	Vocabulary	Homophones, Multiple Meaning & Confusing Words	✓	✓	
Verbal Reasoning	Vocabulary	Crosswords, Puzzles, Word Scrambles	✓	✓	✓
Verbal Reasoning	Verbal Analogies	Word Relations - Pair, Odd One	✓	✓	✓
Verbal Reasoning	Verbal Analogies	Logical Sequencing & Ordering	✓	✓	✓
Writing	Writing Process	Steps & Process	✓	✓	✓
Writing	Narrative Writing	Basic Strcuture & Story Elements	✓	✓	
Writing	Narrative Writing	Advanced (PoV, Themes, Flashbacks and Foreshadowing)			✓
Writing	Expository Writing	Structure, Topic & Evidence		✓	✓
Writing	Descriptive Writing	Structure, Techniques used for Sensory & Descriptive Details			✓
Writing	Persuasive Writing	Structure, Argument Formation & Transitions		✓	✓
Writing	Writing Conventions	Punctuation (Basic) & Capitalization	✓		
Writing	Writing Conventions	Advanced Punctuation & conventions		✓	✓
Writing	Advanced Writing	Idiomatic & figurative language		✓	✓
Writing	Advanced Writing	Visuals, Charts , Graphs & Maps			✓
Communication	Public Speaking	Addressing Fear of Public Speaking		✓	✓
Communication	Public Speaking	Developing Effective Public Speaking		✓	✓
Communication	Public Speaking	Interpretive Reading and Story Tellling			✓
Communication	Public Speaking	Speech Types and Structure		✓	✓
Communication	Public Speaking	Persuasive Speech Presentation		✓	✓
Communication	Public Speaking	Techniques of Argument Construction			✓

*** English Language & Communication(ELC) level 1 course is appropriate for students in Grades 4 & 5 and level 2 for Grade 6.*
*** Each session will be 75 minutes long. We will try our best to cover a topic from each category every week to maintain continuity.*
*** Larger topics within a unit will be covered over several weeks.*
*** Students will be given assignments weekly and are expected to complete their work on time.*
*** For writing part, students will be provided feedback and opportunity to implement the feedback into their writing for improvement.*
*** There are 30 classes and there will be in-class assessments and tests throught out the program duration.*

PUBLIC SPEAKING & DEBATE (PSD) GRADES 6-8

CATEGORY	TOPIC	G6	G7	G8
Public Speaking	Addressing Fear of Public Speaking	✓	✓	✓
Public Speaking	Developing Effective Public Speaking	✓	✓	✓
Public Speaking	Interpretive Reading and Story Tellling		✓	✓
Public Speaking	Persuasion & Rhetoric		✓	✓
Speech Writing	Speech Types and Structure	✓	✓	
Speech Writing	Planning, Organizing & Writing Speeches	✓	✓	
Speech Presentation	Persuasive Speeches	✓	✓	✓
Speech Presentation	Argument Construction (PAEL)	✓	✓	✓
Debate Basics	Understanding Debate	✓		
Debate Basics	Debate Format - CNDF	✓	✓	✓
Debate Basics	Argument Deconstruction & Refutation		✓	✓
Advanced Debate	Premises, Mechanisms & Impact		✓	✓
Advanced Debate	Argument Construction - PEERMS			✓
Advanced Debate	Types of Motions, Burdens, Impact		✓	✓
Advanced Debate	Modeling & Roadmapping	✓	✓	✓
Advanced Debate	Summary/Whip Speeches	✓	✓	✓
Advanced Debate	Debate Format - British Parliamentary			✓
Advanced Debate	POI, Time Signals		✓	✓

*** PSD course may have students from Grades 6-8.*
*** Each session will be 75 minutes long.*
*** Each class will be divided into 3 parts-lesson, in-class activity and assignment.*
*** It is important that students complete their assignments as often, they will be presenting their assignment speech in next class.*
*** We will be dividing students in teams of two when they are practicing debate in class as its a team activity.*
*** It is important to have working camera and microphone for this class as their speech delivery and presentation is important.*



ThaNk YOU