

Pre-K Spring Syllabus



	Topic	Knowledge Point	Content	Ability
1	Chase It!	Visual Tracking	Extend students' attention duration, enhance their attention stability, and help them better adapt to the class through difference contrast and visual tracking practices.	Reasoning
2	Taking Photos	Pictures in Different Views	Through multi-angle observation, discover the differences in object views, gradually transitioning from real objects to abstract graphics, laying a foundation for spatial imagination ability.	Spatial Sense
3	Step by Step	Map and Direction	By learning map basics, students can distinguish between real photos and maps, understand basic map elements, read simple maps, and identify directions (up, down, left, right). They will also gain a basic understanding of world orientation and be able to express it.	Expression
4	Tidy Up	Statistical Graph	Approach multi-angle classification: classify the same group of items from multiple perspectives such as size, color, shape, and type. According to the statistical table, classify and count the items, and compare and express the results.	Measurement and Data
5	Kingdom of Origami	Origami	Through hands-on practice, children can understand the basic folding methods of origami, and be able to independently complete simple origami works. By combining "hole punching games" with mathematical and corresponding thinking, children can exercise their independent hands-on operation ability and spatial imagination ability.	Creativity
6	One Day in Cannery	Number Bond	By using real objects, explore the orderly separation of quantities through hands-on activities, and understand the relationship between the whole and the parts. Combine with real-life scenarios to solve problems related to the combination and separation of quantities in daily life.	Number
7	Shape Beauty Contest	Polygon	Learn polygons on the basis of understanding basic plane shapes. Guide children to observe polygons with different numbers of sides. Find common polygons in life and improve their observation of shapes.	Spatial Sense
8	Party at Beach	Subtraction in 10	Explore "decrease" of objects in life and solve the problem of "how much is left" by counting back. Students will describe the change in quantity with subtraction expression using minus and the equal signs, and solve subtraction problems within 10.	Number
9	Rolling Shapes	Introduction to Solid Figure	Recognize and feel three-dimensional shapes. Students will learn to distinguish cylinders, cones, and spheres (roll, stack). Through tactile games in class, they will experience the characteristics of different shapes and learn about their faces.	Spatial Sense
10	Squary the Pirate	Elimination	In the interesting story, lead the children to experience the magic of elimination method, cultivate the thinking habit of orderly thinking and the ability to solve problems.	Reasoning
11	Top it up	Addition Word Problem	Students will learn how addition within 10 can solve problems encountered in everyday life. They will also understand the two meanings of addition: combining and increasing quantities.	Number
12	Lost in Castle	3D Maze	By solving maze problems, students can improve their spatial sense and problem-solving skills. In class, students will learn how to analyze and solve problems, as well as how to create and design their own mazes. Help students improve their hand-eye coordination, and cultivate their creativity and logical thinking skills.	Spatial Sense
13	Float and Sink	Buoyancy Test	Identify which items will float or sink based on their daily experiences. Students will then conduct experiments to observe and record how different objects behave in water.	Creativity
14	Who is Taller?	Non-standard Measurement	Students will learn to use an item as a standard unit to measure other items. Additionally, they need to understand the principles and usage of a standard balance scale.	Measurement and Data
15	Wowowowo	Exchange with Balanced Scales	With the help of the exchange rules in ancient times, learn the method of equivalent exchange through observation and hands-on activities. Establish basic logical thinking in life scenes.	Reasoning
16	Piggy Bank	Subtraction Word Problem	Students will learn how subtraction within 10 can solve problems encountered in everyday life. They will also understand the two meanings of subtraction: removing a part and decreasing quantities.	Number
17	Tumble Jumble	Block Building	Students need to understand the construction methods of tree-view drawings by assembling and arranging cubes. Additionally, by playing a "through-the-wall" game, they can initially experience how tree-view drawings change from different perspectives.	Spatial Sense
18	Journey to the Cave	Positional Reasoning	Understanding the rules of card games, mastering skills and methods, and inferring the correct order and results. In this process, exercise children's step-by-step thinking and overall layout ability, and cultivate strategic thinking.	Reasoning

Kindergarten Spring Syllabus

H



	Topic	Knowledge Point	Content	Ability
1	Secrets in Graph	Understand Graph	Learn to read and get information from picture graphs and bar graphs. This enhances students' data interpretation and analytical skills.	Measurement and Data
2	Number Clash Adventure	Comparison of Numbers within 100	Learn to understand greater than and less than signs, compare numbers within 100, and sort multiple numbers based on their values. It can enhance students' ability in numerical comparison.	Number
3	Priceless Treasure	Understand Full Hours	Understand clocks and recognize whole hours. This enhances students' time-telling skills.	Measurement and Data
4	Rotating Restaurant	Complex Pattern	Introduce students to rotational patterns by exploring how single shapes or objects appear when rotated. Students will discover the fascinating principles of rotation and the complex rules of composition.	Reasoning
5	The Beauty of the Nature	Number Bond	Understand number bonds and learn to use parts to find the whole, or find the missing part with the whole and part. This enhances students' arithmetic skills and their ability to solve part-whole relationship problems.	Number
6	Treasure on the Island	Number Puzzles in Grids	Develop the reasoning ability by solving the number puzzles in grids and experiencing the fun of "treasure hunting". Students will explore the breakthrough points and methods to complete the puzzles.	Reasoning
7	Everyday Enigmas	Experimental Inquiry	Help students understand some special design and interesting phenomenon through experiment. This improves students' critical thinking and observational skills.	Critical Thinking
8	Simon Says	Identify Positions	Understand your own left and right and others' left and right. This enhances students' spatial awareness and directional skills.	Spatial Sense
9	Build a Skyscraper	Tower of Hanoi	Understand the rules of Hanoi Tower and know how to move several disks from one tower to another with the fewest steps. This enhances students' logical thinking and strategic planning skills.	Creativity
10	Welcome to Mathland!	Simple Number Puzzles	Understand number puzzle in a line and a triangle. Be able to find the missing number with the given sum. This enhances students' numerical reasoning.	Number
11	Home of Little Bee	Identify Regular Shapes	Learn to use shapes to do tiling and complete shapes based on given parts. This enhances students' spatial reasoning and their hands-on skills.	Creativity
12	Mocha Warriors	Positional Reasoning	Understand the rules of a card game with clues on positions. Practice logical reasoning skills to find correct position for each card. It helps to cultivate children's strategic thinking.	Reasoning
13	Cut and Count	Counting Shapes	Learn the concept of "splitting and completing" geometric shapes. Practice by first dividing the shape into parts, then completing it to form a half. This activity enhances children's spatial reasoning and problem-solving skills, fostering mathematical thinking.	Spatial Sense
14	The Strange Hat	Three Views	Understand three views of physical objects and cube combinations. This enhances students' spatial visualization and geometric reasoning skills.	Spatial Sense
15	Animal Chess	Sudoku	Determine the number of visible cubes from each direction and learn to complete the puzzles accordingly. It enhances students' spatial reasoning and problem-solving skills.	Reasoning
16	In Line For A Movie	Lining Up Problems	Understand positions using ordinal numbers and identify the number of people before and after a main character by drawing the line. This enhances students' comprehension of ordinal numbers and their problem-solving skills.	Number
17	Mysterious Market	Equivalent Substitution	Learn how to compare weight of items on balance scales by packing and swapping. This enhances students' understanding of balance concepts and how to compare weight.	Reasoning
18	Whose Building is the Tallest?	Solid Shapes	Explore the relationship between edges and load-bearing capacity in 3D shapes and the impact of height on load-bearing capacity. This enhances students' understanding of structural engineering principles and their manual ability.	Creativity

Kindergarten Spring Syllabus

C


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5	The Beauty of the Nature	Number Bond	Understand number bonds and learn to use parts to find the whole, or find the missing part with the whole and part. This enhances students' arithmetic skills and their ability to solve part-whole relationship problems.	Number
6	Treasure on the Island	Number Puzzles in Grids	Develop the reasoning ability by solving the number puzzles in grids and experiencing the fun of "treasure hunting". Students will explore the breakthrough points and methods to complete the puzzles.	Reasoning
7	Everyday Enigmas	Experimental Inquiry	Help students understand some special design and interesting phenomenon through experiment. This improves students' critical thinking and observational skills.	Critical Thinking
8	Simon Says	Identify Positions	Understand your own left and right and others' left and right. This enhances students' spatial awareness and directional skills.	Spatial Sense
9	How Delicious	Addition Strategy in 20	Learn addition within 20 using fun and effective strategies, such as number bonds, making ten with visual aids, and smart techniques for adding three numbers. This course helps develop children's arithmetic skills, enhances number sense, and promotes logical thinking.	Number
10	Welcome to Mathland!	Simple Number Puzzles	Understand number puzzle in a line and a triangle. Be able to find the missing number with the given sum. This enhances students' numerical reasoning.	Number
11	Home of Little Bee	Identify Regular Shapes	Learn to use shapes to do tiling and complete shapes based on given parts. This enhances students' spatial reasoning and their hands-on skills.	Creativity
12	Mocha Warriors	Positional Reasoning	Understand the rules of a card game with clues on positions. Practice logical reasoning skills to find correct position for each card. It helps to cultivate children's strategic thinking.	Reasoning
13	Cut and Count	Counting Shapes	Learn the concept of "splitting and completing" geometric shapes. Practice by first dividing the shape into parts, then completing it to form a half. This activity enhances children's spatial reasoning and problem-solving skills, fostering mathematical thinking.	Spatial Sense
14	The Strange Hat	Three Views	Understand three views of physical objects and cube combinations. This enhances students' spatial visualization and geometric reasoning skills.	Spatial Sense
15	Animal Chess	Sudoku	Determine the number of visible cubes from each direction and learn to complete the puzzles accordingly. It enhances students' spatial reasoning and problem-solving skills.	Reasoning
16	In Line For A Movie	Lining Up Problems	Understand positions using ordinal numbers and identify the number of people before and after a main character by drawing the line. This enhances students' comprehension of ordinal numbers and their problem-solving skills.	Number
17	Mysterious Market	Equivalent Substitution	Learn how to compare weight of items on balance scales by packing and swapping. This enhances students' understanding of balance concepts and how to compare weight.	Reasoning
18	Magic 10	Subtraction Strategy with picture	Learn subtraction with pictures through various strategies, including counting back by the number line and subtracting to get to ten first.	Number

G1 Spring Syllabus

H


	Topic	Knowledge Point	Content	Ability
1	Graph Genius	Bar Graph	Learn to master the concepts and applications of bar graphs, solving various problems by combining these concepts for more complex scenarios. These skills will enhance students' logical reasoning and problem-solving abilities in contexts related to statistical charts.	Measurement and Data
2	Dice Dynamics	Introduction to Dice	Learn to understand the properties of dice and the principles governing their interactions, including how to determine opposite faces when multiple dice are involved. Students will improve their spatial reasoning skills.	Spatial Sense
3	Calculate Magic	Advanced Addition and Subtraction Strategies	Recognize and solve questions using efficient calculation techniques. Students will understand how these methods are applied and how to identify the rules.	Number
4	Puzzle Pathways	Klotski	Learn to understand and apply the rules of Klotski puzzles, enhancing their logical thinking and strategic planning skills. Students will be able to solve complex problems involving piece movement and puzzle restoration.	Reasoning
5	Compare Quest	Comparative Word problems	Learn to understand and apply the concept of comparative word problems, accurately determine unknown values through comparisons, and solve increasingly complex scenarios. Students will understand comparison techniques and improve their problem-solving abilities.	Number
6	Block Builders	Building Blocks	Learn to use building blocks to solve both basic and complex combination problems. These skills will enhance students' ability to visualize and analyze different block combinations effectively.	Creativity
7	Shape Math	Calculation with Shapes	Explore the concept of pictorial equations. Students will be able to use formulas to calculate areas of various geometric shapes. They learn how to work backward to find missing numbers.	Reasoning
8	Move it, Move it!	Move for Fairness	Learn to correctly use the concept of balancing quantities by moving and adjusting amounts, particularly with visual aids or without them, and determine differences accurately. These skills will enhance students' problem-solving abilities in quantitative reasoning.	Number
9	Number Maze	Number Matrix	Learn to understand the characteristics of number decomposition, enumerate possible combinations, and accurately break down numbers into specified parts. These skills will enhance students' numerical reasoning, understanding of number properties, and problem-solving abilities related to enumeration and decomposition.	Reasoning
10	Number Engineer	Split Numbers	Learn to understand the concept of number splitting, master ordered enumeration techniques, identify patterns in number combinations, and solve problems involving various splitting models. These skills will enhance students' understanding of numerical relationships and strengthen their logical reasoning.	Number
11	Dimension Detective	Three View Combination	Learn to understand three-view diagrams, accurately interpret and draw individual 3D shapes, and combine multiple shapes into composite views. These skills will enhance students' spatial reasoning, visualization abilities, and problem-solving skills in geometric contexts.	Spatial Sense
12	Revisit the Past	Inverse Problems	Learn to solve restoration problems, understand the processes involved, and apply logical reasoning to reconstruct original quantities. These skills will enhance students' problem-solving abilities in scenarios involving partial information and transformations.	Number
13	Time Mastery	Time Planning	Learn to understand time management concepts, create schedules using Gantt charts, and apply logical reasoning to coordinate simultaneous activities. These skills will enhance students' planning abilities, problem-solving skills, and systematic thinking in managing time effectively.	Expression
14	Numeric Mysteries	Addition and Subtraction Column Puzzle	Learn to apply strategies and analytical techniques to solve vertical addition and subtraction puzzles efficiently. These skills will enhance students' numerical reasoning and problem-solving abilities in arithmetic contexts.	Reasoning
15	Shape Explorer	Solid Shapes and Nets	Learn to recognize and understand 3D shapes, including prisms, cones, frustums, and spheres, as well as how to construct these shapes. Additionally, students will learn to identify and work with the nets of these shapes, enhancing their spatial reasoning skills.	Creativity
16	Little Investigator	Comparative and Reasoning with Positions	Learn to apply positional reasoning techniques, including direct comparisons and more complex relational analysis. Students will be able to understand key concepts of spatial relationships and interpret positional information effectively.	Reasoning
17	Time Crunch	Calculating Time	Learn to accurately calculate time, including determining start times, end times, and elapsed time. These skills will enhance students' understanding of time calculations.	Measurement and Data
18	Code Crackers	Finding the Code	Learn to develop and apply decoding strategies for different types of ciphers, enhancing students' cryptographic skills. These techniques will enable students to understand and interpret various coded messages.	Reasoning

G1 Spring Syllabus C



	Topic	Knowledge Point	Content	Ability
1	Graph Genius	Bar Graph	Learn to master the concepts and applications of bar graphs, solving various problems by combining these concepts for more complex scenarios. These skills will enhance students' logical reasoning and problem-solving abilities in contexts related to statistical charts.	Measurement and Data
2	Shape Explorer	Solid Shapes and Nets	Learn to recognize and understand solid shapes, including prisms, cones, cylinders, and spheres, as well as how to construct these shapes. Additionally, students will learn to identify and work with the nets of these shapes, enhancing their spatial reasoning skills.	Creativity
3	Calculate Magic	Advanced Addition and Subtraction Strategies	Recognize and solve questions using efficient calculation techniques. Students will understand how these methods are applied and how to identify the rules.	Number
4	Puzzle Pathways	Klotski	Learn to understand and apply the rules of Klotski puzzles, enhancing their logical thinking and strategic planning skills. Students will be able to solve complex problems involving piece movement and puzzle restoration.	Reasoning
5	Compare Quest	Comparative Word problems	Learn to understand and apply the concept of comparative word problems, accurately determine unknown values through comparisons, and solve increasingly complex scenarios. Students will understand comparison techniques and improve their problem-solving abilities.	Number
6	Block Builders	Building Blocks	Learn to use building blocks to solve both basic and complex combination problems. These skills will enhance students' ability to visualize and analyze different block combinations effectively.	Creativity
7	Shape Math	Calculation with Shapes	Explore the concept of pictorial equations. Students will be able to use formulas to calculate areas of various geometric shapes. They learn how to work backward to find missing numbers.	Reasoning
8	Move it, Move it!	Move for Fairness	Learn to correctly use the concept of balancing quantities by moving and adjusting amounts, particularly with visual aids or without them, and determine differences accurately. These skills will enhance students' problem-solving abilities in quantitative reasoning.	Number
9	Number Maze	Number Matrix	Learn to understand the characteristics of number decomposition, enumerate possible combinations, and accurately break down numbers into specified parts. These skills will enhance students' numerical reasoning, understanding of number properties, and problem-solving abilities related to enumeration and decomposition.	Reasoning
10	Number Engineer	Split Numbers	Learn to understand the concept of number splitting, master ordered enumeration techniques, identify patterns in number combinations, and solve problems involving various splitting models. These skills will enhance students' understanding of numerical relationships and strengthen their logical reasoning.	Number
11	Dimension Detective	Three View Combination	Learn to understand three-view diagrams, accurately interpret and draw individual 3D shapes, and combine multiple shapes into composite views. These skills will enhance students' spatial reasoning, visualization abilities, and problem-solving skills in geometric contexts.	Spatial Sense
12	Revisit the Past	Inverse Problems	Learn to solve restoration problems, understand the processes involved, and apply logical reasoning to reconstruct original quantities. These skills will enhance students' problem-solving abilities in scenarios involving partial information and transformations.	Number
13	Time Mastery	Time Planning	Learn to understand time management concepts, create schedules using Gantt charts, and apply logical reasoning to coordinate simultaneous activities. These skills will enhance students' planning abilities, problem-solving skills, and systematic thinking in managing time effectively.	Expression
14	Numeric Mysteries	Addition and Subtraction Column Puzzle	Learn to apply strategies and analytical techniques to solve vertical addition and subtraction puzzles efficiently. These skills will enhance students' numerical reasoning and problem-solving abilities in arithmetic contexts.	Reasoning
15	Understand Multiplication	x but not cross	Understand the concept of multiplication and use a multiplication table to help with calculations. Cultivate children's number sense.	Number
16	Little Investigator	Comparative and Reasoning with Positions	Learn to apply positional reasoning techniques, including direct comparisons and more complex relational analysis. Students will be able to understand key concepts of spatial relationships and interpret positional information effectively.	Reasoning
17	Time Crunch	Calculating Time	Learn to accurately calculate time, including determining start times, end times, and elapsed time. These skills will enhance students' understanding of time calculations.	Measurement and Data
18	Code Crackers	Finding the Code	Learn to develop and apply decoding strategies for different types of ciphers, enhancing students' cryptographic skills. These techniques will enable students to understand and interpret various coded messages.	Reasoning

G2 Spring Syllabus

H



	Topic	Knowledge Point	Content	Ability
1	Area Aces	Understand Area	Explore the concept of area. Students will be able to use formulas to calculate the area of rectangles and squares. They learn how to work backward from a known area to find missing dimensions.	Spatial Sense
2	Clockwork Mechanics	Gears Turning	Learn to understand gears and the principles of gear movement, including how gears change direction and speed during rotation. Students will understand the effects of gear interactions.	Creativity
3	Special Role in Division	Division With Remainders	Build on previous learning of division, students will continue learn division with remainders. Students will be able to solve problems involving remainders.	Number
4	Round and Round	Find the Cycle	Understand what a cycle is and identify cycles in word problems. Use the relationships between the cycle and remainder to find the item based on the given position, and to calculate the total number of items in cycle.	Number (word problem)
5	Sum Up Segments	Sum-Multiples Problems	Use line segments to visualize the problems with sums and multiples. Enhance students' ability of combining numerical and geometrical concepts.	Number (word problem)
6	VIP Room	Add and Remove Parentheses	Know the properties of addition and utilize properties in pairing numbers and tricks of making tens. Master the rules of adding and removing parentheses in addition and subtraction.	Number
7	Perfect Partitions	Shape Division	Learn to divide shapes into specific parts, enhancing their spatial reasoning and geometric understanding. Students will be able to solve complex problems involving shape division and reforming.	Spatial Sense
8	Difference in Segments	Difference-Multiples Problems	Use line segments to visualize problems with differences and multiples. Cultivate the ability to understand how to read and solve problems with differences and multiples, and the ability to turn complex problems into simple graphs.	Number (word problem)
9	Gaming Buddy	Rolling the Dice	According to the characteristics of standard dice, find the pattern of the rolling dice, and then solve problems.	Creativity
10	Growing Up Chronicles	Age Problems	Understand characteristics including the differences and sums of ages. Convert age problems into sums, differences, and multiples problems to better analyze and solve them.	Number (word problem)
11	Magic Dot	Understand Decimals	Understand the meaning of decimals and the relationship between fractions and decimals. Compare decimals according to place values, and solve problems in real life.	Number
12	Temperature Reporter	Thermometer Puzzle	Learn to apply logical reasoning to solve thermometer puzzles. These skills will enhance students' logical reasoning, problem-solving abilities, and systematic thinking in puzzle-solving scenarios.	Reasoning
13	Match and Pop	Advanced Operations without Number	Learn how to solve equations with pictures by adding and subtracting them based on their characteristics. Enhance logical reasoning ability and introduce the basic concept of algebra.	Reasoning
14	My Best Friend	Multiplication and Division Strategies	Learn to apply strategies and rearrangement techniques to simplify and solve multiplication and division problems efficiently.	Number
15	Data Genie	Data Analysis in Graphs	Explore the basic statistical concepts. Learn to find or calculate the average, mode, median, and range in bar and line graphs. Build an understanding of statistics.	Measurement and Data
16	Finance Expert	Addition and Subtraction of Decimals	Understand the addition and subtraction methods of decimals. Learn how to calculate simple operations mentally, and calculate complex operations with column addition and subtraction. Solve some real-life problems.	Number
17	All the Way Around	Strategies of Finding Perimeter	Learn to accurately calculate the perimeter of irregular shapes by the translation method. Use hands-on methods to experience changes in perimeter to solve problems. These skills will enhance students' geometric understanding.	Spatial Sense
18	Victory Forever	Winning Strategy	Learn to develop and apply winning strategies for games involving different step moves per turn, both with and without remainder considerations.	Expression

G2 Spring Syllabus

G


	Topic	Knowledge Point	Content	Ability
1	Area Aces	Understand Area	Explore the concept of area. Students will be able to use formulas to calculate the area of rectangles and squares. They learn how to work backward from a known area to find missing dimensions.	Spatial Sense
2	Clockwork Mechanics	Gears Turning	Learn to understand gears and the principles of gear movement, including how gears change direction and speed during rotation. Students will understand the effects of gear interactions.	Creativity
3	Number Tower	Number Patterns in Shapes	Explore the square number pattern and pyramid number pattern by observing figures. Distinguish different patterns and solve complex number patterns.	Number
4	Round and Round	Find the Cycle	Understand what a cycle is and identify cycles in word problems. Use the relationships between the cycle and remainder to find the item based on the given position, and to calculate the total number of items in cycle.	Number (word problem)
5	Sum Up Segments	Sum-Multiples Problems	Use line segments to visualize the problems with sums and multiples. Enhance students' ability of combining numerical and geometrical concepts.	Number (word problem)
6	VIP Room	Add and Remove Parentheses	Know the properties of addition and utilize properties in pairing numbers and tricks of making tens. Master the rules of adding and removing parentheses in addition and subtraction.	Number
7	Perfect Partitions	Shape Division	Learn to divide shapes into specific parts, enhancing their spatial reasoning and geometric understanding. Students will be able to solve complex problems involving shape division and reforming.	Spatial Sense
8	Difference in Segments	Difference-Multiples Problems	Use line segments to visualize problems with differences and multiples. Cultivate the ability to understand how to read and solve problems with differences and multiples, and the ability to turn complex problems into simple graphs.	Number (word problem)
9	Gaming Buddy	Rolling the Dice	According to the characteristics of standard dice, find the pattern of the rolling dice, and then solve problems.	Creativity
10	Growing Up Chronicles	Age Problems	Understand characteristics including the differences and sums of ages. Convert age problems into sums, differences, and multiples problems to better analyze and solve them.	Number (word problem)
11	Magic Dot	Understand Decimals	Understand the meaning of decimals and the relationship between fractions and decimals. Compare decimals according to place values, and solve problems in real life.	Number
12	Temperature Reporter	Thermometer Puzzle	Learn to apply logical reasoning to solve thermometer puzzles. These skills will enhance students' logical reasoning, problem-solving abilities, and systematic thinking in puzzle-solving scenarios.	Reasoning
13	Match and Pop	Advanced Operations without Number	Learn how to solve equations with pictures by adding and subtracting them based on their characteristics. Enhance logical reasoning ability and introduce the basic concept of algebra.	Reasoning
14	My Best Friend	Multiplication and Division Strategies	Learn to apply strategies and rearrangement techniques to simplify and solve multiplication and division problems efficiently.	Number
15	Data Genie	Data Analysis in Graphs	Explore the basic statistical concepts. Learn to find or calculate the average, mode, median, and range in bar and line graphs. Build an understanding of statistics.	Measurement and Data
16	Finance Expert	Addition and Subtraction of Decimals	Understand the addition and subtraction methods of decimals. Learn how to calculate simple operations mentally, and calculate complex operations with column addition and subtraction. Solve some real-life problems.	Number
17	All the Way Around	Strategies of Finding Perimeter	Learn to accurately calculate the perimeter of irregular shapes by the translation method. Use hands-on methods to experience changes in perimeter to solve problems. These skills will enhance students' geometric understanding.	Spatial Sense
18	Victory Forever	Winning Strategy	Learn to develop and apply winning strategies for games involving different step moves per turn, both with and without remainder considerations.	Expression

G2 Spring Syllabus

ACE



	Knowledge Point	Content	Ability
1	Long Division	Learn about long division, including the place for the remainders. Be able to divide three-digit numbers by one-digit numbers using long division. Master division involving 0.	Number
2	Number Patterns in Shapes	Observe number patterns in triangles and squares. Combine numbers with shapes to calculate the sum of a pyramid sequence quickly. Cultivate the ability of observation and calculation.	Number
3	Clockwork Mechanics	Learn to understand gears and the principles of gear movement, including how gears change direction and speed during rotation. Students will understand the effects of gear interactions.	Creativity
4	Find the Cycle	Understand what a cycle is and identify cycles in word problems. Use the relationships between cycle and remainder to solve problems.	Number (word problem)
5	Tree Diagram	Use tree diagrams to solve problems involving enumeration. Distinguish the difference between the problem starting from "Step 1" and the problem starting from "Step 2".	Reasoning
6	Multiplication Strategies	Use commutative law and distributive law of multiplication to solve operations quickly and efficiently.	Number
7	Inverse Operation Problems	Find the original with a known result and calculation steps. Cultivate inverse thinking ability and solve related real-life problems.	Number (word problem)
8	Age Problems	Understand characteristics including the differences and sums of ages. Convert age problems into sums, differences and multiples problems to better analyze and solve them.	Number (word problem)
9	Rolling the Dice	According to the characteristics of standard dice, find the pattern of the rolling dice, and then solve problems.	Creativity
10	Understand Decimals	Understand the meaning of decimals and the relationship between fractions and decimals. Compare decimals according to place values, and solve problems in real life.	Number
11	Magic Line Segment	Use line segments to visualize the problems with sum, difference, and multiple. Cultivate the ability to understand how to read and solve problems with sum, difference, and multiple, and the ability to turn complex problems into simple graphs.	Number (word problem)
12	Find the Average	Understand the meaning of average and weighted average. Solve complex problems using the idea of balancing.	Number (word problem)
13	Advanced Operations without Number	Learn how to solve equations with pictures by adding and subtracting them based on their characteristics. Enhance logical reasoning ability and introduce the basic concept of algebra.	Reasoning
14	Data Analysis in Graphs	Explore the basic statistical concepts. Learn how to find or calculate the average, mode, median, and range in bar graphs and line graphs. Build an understanding of statistics.	Measurement and Data
15	Division Strategies	Use "distributive law of division" and property of unchanged quotient to solve operations quickly and efficiently.	Number
16	Addition and Subtraction of Decimals	Understand the addition and subtraction methods of decimals. Learn how to calculate simple operations mentally, and calculate complex operations with column addition and subtraction. Solve some real-life problems.	Number
17	Strategies of Finding Perimeter	Calculate the perimeter of irregular shapes by the translation method. Use hands-on method to experience changes in perimeter to solve problems.	Spatial Sense
18	Strategies of Finding Area	Use methods of splitting and patching to find the area of an irregular shape. Observe the relationships among different parts in an irregular shape and use them to find the area of the shape. Consolidate methods for finding the area, and learn how to solve it quickly.	Spatial Sense



	Topic	Content	Common Core Standard
1	Numbers in Base Ten (Million)	Recognize Place Values of Large Numbers Within One Million Compare Large Numbers Within One Million Solve Multi-Step Addition and Subtraction Word Problems with Large Numbers	CC4.NBT
2	Factors	Recognize and Find Factors Determine Factors Using Division Find Greatest Common Factor	CC4.OA
3	Prime and Composite Numbers	Determine Whether a Number is Prime or Composite Prime and Composite Numbers Within 30 Use the Properties of Prime and Composite Numbers for Logical Reasoning	CC4.OA
4	Multiples	Recognize and Determine Multiples Understand the Relationship Between Factors and Multiples Find Least Common Multiple	CC4.OA
5	Metric Mass and Volume	Understand and Convert Metric Units of Mass Understand and Convert Metric Units of Volume Solve Word Problems with Metric Unit Conversions for Mass and Volume	CC4.MD
6	Measure Angles	Understand Degrees Measure Angles Using Protractor Count the Number of Angles	CC4.MD
7	Multi-digit Number Multiplication	Estimate Multiplication Multiply Multi-Digit Numbers by Two-Digit Numbers Solve Word Problems Involving Multi-Digit Numbers Multiplied by Two-Digit Numbers	CC4.NBT
8	Find Unknown Angles	Calculate Angle Addition Calculate Angle Subtraction Calculate the Degrees of Unknown Angles in Figures	CC4.MD
9	Area of Composite Figure	Calculate the Area of Composite Figures by Dividing Calculate the Area of Composite Figures by Filling Find the Area of Composite Figures Cleverly	CC4.G
10	Angles in a Triangle	Identify the Angle Properties of Isosceles and Equilateral Triangles Understand the Sum of Interior Angles in a Triangle Equals 180 Degrees Calculate the Degrees of Interior Angles in a Triangle	CC4.G
11	Applications of the Lines of Symmetry	Count Lines of Symmetry Identify Lines of Symmetry in Geometric Shapes Apply Lines of Symmetry in Geometric Shapes	CC4.G
12	Compare Fractions	Review Comparing Fractions with the Same Denominators or Numerators Compare Fractions Using Fraction Strips Compare Fractions by Finding a Common Denominator	CC4.NF
13	Fractions and Decimals	Find the Expanded Form of Decimals Convert Fractions to Decimals Convert Decimals to Fractions	CC4.NF
14	Compare Decimals	Compare Decimals with Same Place Values Compare Decimals with Different Place Values Compare Fractions and Decimals	CC4.NBT
15	Advance Bar Graph	Read Double Bar Graphs Draw Double Bar Graphs Apply Bar Graphs in Real-Life Problems	CC4.MD
16	Venn Diagram	Understand Two-Element Venn Diagrams Understand Three-Element Venn Diagrams Solve Word Problems with Venn Diagrams	CC4.MD
17	Use Shapes to Represent the Unknown	Use Shapes to Explore Their Operational Meanings Find the Unknown Numbers Represented by Shapes Logical Reasoning with Shapes	CC4.OA
18	Repeating Pattern Problems	Find Repeating Patterns in Number Sequences The Number of Times a Number Appears in a Sequence Explore Repeating Patterns in Calendars	CC4.OA

G3 Spring Syllabus **Challenge**



	Topic	Content	Module
1	Number Puzzle with Multiplication	Review the process of vertical multiplication. Solve number puzzles with one unknown digit, including those that involve carrying. Use last-digit analysis to solve puzzles with two unknowns. Learn to solve complex puzzles using estimation, analysis, and trial and error.	Number & Operations in Base Ten
2	Advanced Multiplication of Decimals	Master multiplication with decimals and apply it to word problems involving multiples and area.	Number & Operations in Base Ten
3	Inverse Operation Problems	Learn to use the "train diagram" and working backward method to solve restoration problems, from basic numerical puzzles to complex word problems.	Operations & Algebraic Thinking
4	Tricks for the area of quadrilaterals	Master using the cut-and-paste method to find the area of quadrilaterals on a grid and other composite shapes. Learn to apply area formulas in reverse to solve more complex problems, including those involving the properties of parallel lines.	Geometry
5	Strategies with Decimals	Learn techniques for mental calculation in decimal addition, subtraction, and multiplication, and master the application of the distributive property.	Number & Operations in Base Ten
6	Advanced Division of Decimals	Understand the principle of an invariant quotient to master the calculation method for division problems where the divisor is a decimal.	Number & Operations in Base Ten
7	Finding Patterns	Master methods for identifying patterns in shapes and number sequences, and apply parity analysis to solve problems.	Operations & Algebraic Thinking
8	Triangles	Master the classification of triangles by their side and angle properties, and understand the "sum of two sides is greater than the third" property.	Geometry
9	Calculating Angles in Triangles	Master the Triangle Angle Sum Theorem and apply the unique properties of right, isosceles, and equilateral triangles to perform angle calculations.	Geometry
10	Advanced Word Problems on Multiplication and Division	Extend the ability to analyze quantitative relationships from integer-based problems to solve multiplication and division word problems involving decimals.	Operations & Algebraic Thinking
11	Prime and Composite Numbers	Master the key concepts of prime, composite, and relatively prime numbers, with the ability to identify primes within 30.	Operations & Algebraic Thinking
12	Equivalent Fractions	Develop an intuitive understanding of equivalent fractions through visual models and master the fundamental properties of fractions. Learn to simplify fractions using cancellation.	Number & Operations - Fractions
13	Advanced Word Problems of Time	Master complex time calculations involving crossing days and time zones.	Measurement & Data
14	Basic Addition and Subtraction of Fractions	Understand addition and subtraction of fractions and mixed numbers with like denominators, including simplifying results.	Number & Operations - Fractions
15	Advanced Addition and Subtraction of Fractions	Master the method of finding common denominators to solve addition and subtraction problems with unlike fractions. Cultivate the mathematical concept of transformation and flexible problem-solving skills.	Number & Operations - Fractions
16	Complicated Age Problems	Utilize the core principle of invariant age difference, combined with diagrammatic analysis, to solve various complex age-related word problems.	Operations & Algebraic Thinking
17	Comparing Fractions and Decimals	Master the bidirectional conversion between fractions (including mixed numbers) and decimals, applying this to compare magnitudes by flexibly choosing the appropriate form.	Number & Operations - Fractions
18	Inclusion and Exclusion	Master the use of Venn diagrams to understand the relationships between sets and solve basic inclusion-exclusion problems.	Operations & Algebraic Thinking

G3 Spring Syllabus

ACE



	Topic	Content	Module
1	Triangles	Recognize triangles, and understand its definition, its classification and its graphic features. Experiment with the proof of the sum of the interior angles of triangles, and apply it to solve angle-related problems.	Geometry
2	Basic Arithmetic Sequence	Find the general term of an arithmetic sequence and calculate the number of terms in arithmetic sequences.	Algebra and Sequence
3	Inverse Operation Problems	Master drawing tools and reverse logic to solve inverse operation problems that include multiple computations. Cultivate application awareness.	Word Problems
4	Prime and Composite Numbers	Understand the concept of factors, multiples, prime and composite numbers. Learn to determine if a number is prime or not. Know a special prime number (2) and its application. Enhance number sense and computation skills.	Number Theory
5	Advanced Addition and Subtraction of Fractions	Learn to find the common factors and multiples of two numbers by enumeration. Master the method of finding common denominators to solve addition and subtraction problems with unlike fractions. Cultivate the mathematical concept of transformation and flexible problem-solving skills.	Numbers and Operations
6	Distribution Problems	Applications of division with remainders. Analyze and solve complex distribution problems.	Word Problems
7	Area of a Triangle	Learn the properties of a triangle and the area formula. Understand how to solve related word problems and build spatial cognition abilities.	Geometry
8	Representing Unknown Numbers	Learn to use letters in representing numbers, and to simplify algebraic expressions with letters. Represent equality relationships with variables.	Algebra and Sequence
9	Multiplication of Fractions	Calculate the multiplication of proper fractions, improper fractions, and mixed numbers. Be familiar with basic computation and quick multiplication and raise the speed of multiplication.	Numbers and Operations
10	Division of Fractions	Calculate the division of proper fractions, improper fractions, and mixed numbers. Be familiar with basic computation and raise the speed of division.	Numbers and Operations
11	Inclusion and Exclusion	Learn about word problems on inclusion and exclusion and understand the concept of partial overlapping.	Combinatorics
12	Basic Equations	Recognize simple equations. Discuss the methods to solve the equations. Apply simple equations to solve word problems, and perceive the merits of equation application.	Algebra and Sequence
13	Tricks to Solve the Area	Review the method of cutting and forming new shapes. Using the formulas of areas of parallelogram, trapezoid, and triangle to solve the area of irregular figures inversely. Learn new tricks to solve the area of different shapes and build spatial cognition abilities.	Geometry
14	Advanced Distance, Speed, and Time	Review the relationship between speed, time, and distance. Learn how to use uncommon units as distance units, convert composite speed units, and address variable speed problems.	Word Problems
15	Complicated Rule of Sum and Rule of Product	Apply the rule of sum and product on sequence-related word problems and enhance application awareness.	Counting, Probability, and Statistics
16	Specified Operation	Solve problems with new operations defined. Observe and interpret math tricks using new operations.	Numbers and Operations
17	Complicated Chicken and Rabbit Problems	Discuss generalized chicken & rabbit problems by grouping method. Apply the grouping method to solve different types of chicken & rabbit problems.	Word Problems
18	Basic Probability	Recognize probability and its definition, learn simple probability questions, and enhance data analysis skills.	Counting, Probability, and Statistics

G3 Spring Syllabus

ACE+



	Topic	Content	Module
1	Calendar and Period	Learn to read calendars and extract information. Know the interval problems in weeks, years, and other calendar units.	Word Problems
2	Inverse Operation Problems	Master drawing tools and reverse logic to solve inverse operation problems that include multiple computations. Cultivate application awareness.	Word Problems
3	Phalanx	Determine relations among solid and hollow phalanxes. Count people in different formations.	Combinatorics
4	Distribution Problems	Applications of division with remainders. Use tables to analyze and solve complex distribution problems.	Word Problems
5	Addition and Subtraction of Fractions	Calculate proper fractions, improper fractions, and mixed numbers. Master reduction of fractions to a common denominator and practice computation skills.	Numbers and Operations
6	Number Puzzle	Use tricks to solve number puzzles and boost computation skills. Enhance number sense.	Numbers and Operations
7	Inclusion and Exclusion	Learn about word problems on inclusion and exclusion and understand the concept of partial overlapping.	Combinatorics
8	Prime and Composite Numbers	Understand the concept of prime and composite numbers. Learn special prime numbers and their application. Enhance number sense and computation skills.	Number Theory
9	Multiplication of Fractions	Calculate the multiplication of proper fractions, improper fractions, and mixed numbers. Be familiar with basic computation and quick multiplication and raise the speed of multiplication.	Numbers and Operations
10	Division of Fractions	Calculate the division of proper fractions, improper fractions, and mixed numbers. Be familiar with basic computation and raise the speed of division.	Numbers and Operations
11	Simple Equations	Recognize simple equations. Discuss the methods to solve the equations. Apply simple equations to solve word problems, and perceive the merits of equation application.	Algebra and Sequence
12	Complicated Mean Problem	Find the average directly and solve the weighted average problem. Learn how to find the average by using the principle of inclusion-exclusion.	Word Problems
13	Tricks to Solve the Area	Review the method of cutting and forming new shapes. Using the formulas of areas of parallelogram, trapezoid, and triangle to solve the area of irregular figures inversely. Learn new tricks to solve the area of different shapes and build spatial cognition abilities.	Geometry
14	Complicated Rule of Sum and Rule of Product	Apply the principle of sum and product on sequence-related word problems and enhance application awareness.	Counting, Probability, and Statistics
15	Rectangular Numerical Table	Observe and solve rectangular numerical tables based on knowledge of arithmetic sequences. Cultivate computation and observation skills.	Algebra and Sequence
16	Sum, Difference, and Multiple	Learn to solve the problems of sum, difference, and multiple combined with real situations. Experiment with the method of drawing line segments to suggest numerical relations. Develop the thinking of symbolic-graphic combination, and mathematic abilities for problem solving.	Word Problems
17	Probability	Recognize probability and its definition, learn simple probability questions, and enhance data analysis skills.	Counting, Probability, and Statistics
18	Winning Strategies	Boost logical reasoning and innovative thinking by learning winning strategies for games such as picking matches, stones, and drawing squares.	Combinatorics

G4 Spring Syllabus

H



	Topic	Content	Common Core Standard
1	Know Volume	Know Volume Use Unit Cubes to Measure Volume Count Unit Cubes in Layers to Find Volume	CC5.MD
2	Volume of Rectangular Prisms	Know the Components of a Rectangular Prism Use Different Formulas to Find Volume of a Rectangular Prism Solve One-Step Real-World Problems of Volume	CC5.MD
3	Multiplication of Fractions	Fractions Multiplied by Whole Numbers Fractions Multiplied by Fractions Simplify the Multiplication of Fractions	CC5.NF
4	Basic Division of Fractions	Understand Division of Fractions and Whole Numbers Divide Whole Numbers by Fractions Divide Fractions by Whole Numbers	CC5.NF
5	Advanced Division of Fractions	Understand Division of Fractions Divide Fractions by Fractions Advanced Word Problem Involving Division of Fractions	CC6.NS
6	Advanced Division of Multi-digit Numbers	Estimate Quotients Divide a 2-Digit Number by a 2-Digit Number Divide a 3-Digit Number by a 2-Digit Number	CC5.NBT
7	Multiplication of Decimals	Understand Multiplication of Decimals Long Multiplication of Decimals and Whole Numbers Long Multiplication of Decimals and Decimals	CC5.NBT
8	Basic Division of Decimals	Divide Whole Numbers to Find the Quotient of a Decimal Divide Decimals by One-Digit Whole Numbers Solve Real-World Problems about Division of Decimals	CC5.NBT
9	Estimation of Decimals	Estimate Addition and Subtraction of Decimals Estimate Multiplication of Decimals Estimate Division of Decimals	CC5.NBT
10	Basic Whole Number Equation	Review Letters Represent Unknown Numbers Know the Property of Equations Solve One-Step Equations	CC6.EE
11	Advanced Whole Number Equation	Know the Like Terms Group the Like Terms Solve Two-Step Equations	CC6.EE
12	Volume of Combined Solid Figures	Find Volume of Solid Figures Combined by Rectangular Prisms Solve Real-World Problems of Combined Solid Figures Solve Two-Step Real-World Problems of Volume	CC5.MD
13	Advanced Improper Fractions and Mixed Numbers	Convert Between Improper Fractions and Mixed Numbers Convert Between Division and Fractions Convert Between Mixed Numbers and Decimals	CC5.NF
14	Basic Multiplication and Division of Mixed Numbers	Understand Multiplication and Division of Mixed Numbers Multiplication and Division of Mixed Numbers and Whole Numbers Multiplication and Division of Mixed Numbers and Fractions	CC5.NF
15	Advanced Multiplication and Division of Mixed Numbers	Multiplication and Division of Mixed Numbers Estimate Multiplication and Division of Mixed Numbers Know the Property of Multiplication and Division of Mixed Numbers	CC6.NS
16	Line Plot	Make a Line Plot Interpret a Line Plot Find the Average on a Line Plot	CC5.MD
17	Strategies of Multiplication and Division of Decimals	Multiply Decimals with Round Numbers Divide Decimals by Round Numbers Group Friendly Numbers of Decimals as a Strategy	CC5.NBT
18	Advanced Division of Decimals	Decimals Divided by Whole Numbers Divide Decimals with the Same Place Value Divide Decimals with Different Place Value	CC5.NBT

G4 Spring Syllabus

Intro to Challenge/Challenge



	Topic	Content	Module
1	Calculation Strategies on Fractions, Decimals, and Percentages	Review the distributive law of multiplication. Understand the inverse application of distributive law of multiplication and master the tricks to extract common factors.	Numbers and Operations
2	Basic Circles	Discuss the history of circles. Introduce the characteristics and other properties of circles. Find the areas and perimeters of circles.	Geometry
3	Properties and Applications of Remainders	Understand the relationship between dividend, divisor, quotient, and the remainder. Learn the features of remainders. Apply the knowledge of remainders to solve complicated number theory problems.	Number Theory
4	Solving Advanced Word Problems with Equations	Continue solving more complicated word problems by forming equations ("chickens and rabbits", "profit and loss", etc.).	Word Problems
5	Inductive Recursion	Find patterns out of figures. Study the Fibonacci Sequence. Apply the recursion of Fibonacci Sequence to complicated problems.	Combinatorics
6	Advanced Circles	Review the method of calculating circumference and area of a circle. Learn the method of calculating areas of sectors and annulus.	Geometry
7	Perfect Square	Know perfect squares and learn to calculate perfect squares. Judge whether a number is a perfect square, and apply the number theory knowledge to perfect squares.	Numbers and Operations
8	Fun Traveling Problems	Discuss a series of topics in train problems and boat problems. In train problems, the traveling object has a length that cannot be neglected and it is passing a bridge or a tunnel. In boat problems, distinguish the traveling speed in the water when going downstream and upstream. Apply these models to solve travel word problems.	Word Problems
9	Basic Cubes and Rectangular Prisms	Understand cubes and rectangular prisms. Learn the calculation method of surface area and volume, and be able to complete some problems related to surface area and volume.	Geometry
10	Fractional Equations	Review the basic rules of equations and learn how to solve fractional coefficient equations.	Algebra and Sequence
11	Advanced Arithmetic Sequences	Review general term formula of arithmetic sequences. Learn how to find the sum and use the sum to find the middle term of an arithmetic sequences. Apply the knowledge of arithmetic sequence to solve problems.	Algebra and Sequence
12	Graphing Distance and Time	Review the relationship between speed, distance, and time. Analyze the changes in the movement process according to the images and words and solve problems.	Word Problems
13	Advanced Cubes and Rectangular Prisms	Review the methods for calculating surface area and volume. Cut rectangular prisms and learn how to find the new surface area. Learn how to determine the volume after melting a cube to form a rectangular prism.	Geometry
14	Scale	Review the conversion between common measurements of length in daily life. Understand the proportional scale and use it to solve a series of problems. Understand the changing relationship between length ratio and area ratio.	Word Problems
15	Equal Altitude Model	Study the relation between bases and areas of same or equal altitude triangles. Apply interpretation to triangle related problems.	Geometry
16	Advanced Statistical Graphs	Introduce the key methods for solving questions, such as percentage and angle calculations in pie charts, the line plot related to geometric properties, and the effect of adding or changing a number on the mean, median, and mode. The aim is to enhance skills in data analysis and chart interpretation.	Counting, Probability, and Statistics
17	Pythagorean Theorem	Learn the history of the Pythagorean Theorem. Understand the meaning of the Pythagorean theorem and the proof method. Memorize the common hook numbers and apply them to geometry problems.	Geometry
18	Congruence Modulo	Understand the meaning of congruence, learn the properties of congruence, and learn to use the congruence theorem to solve related number theory problems.	Number Theory

G4 Spring Syllabus **ACE+**



	Topic	Content	Module
1	Counting Figures	Solve problems of graph counting using classified enumeration and correspondence analysis. Cultivate an orderly and methodical counting mindset.	Counting, Probability, and Statistics
2	Transformation of Figures	Be able to rotate a figure around either a point on the figure or a point outside the figure. View the generation of geometric figures through rotation. Solve complicated geometry problems using the idea of rotation.	Geometry
3	Properties and Applications of Remainders	Understand the relationship between dividend, divisor, quotient, and the remainder. Learn the features of remainders. Apply the knowledge of remainders to solve complicated number theory problems.	Number Theory
4	Advanced Numerical Table	Based on arithmetic sequences, find rules for different numerical tables and find general terms to solve problems. Build a solid computational foundation.	Algebra and Sequence
5	Half-Area Model	Split rectangles, parallelograms, trapezoids and general irregular quadrilaterals into two equal area parts. Extend the idea in complicated geometry problems with half area models.	Geometry
6	Perfect Square	Know perfect squares and learn to calculate perfect squares. Judge whether a number is a perfect square, and apply the number theory knowledge to perfect squares.	Number Theory
7	Pigeonhole Principle	Understand the basics and history of the pigeonhole principle and use it to solve simple problems. Experience the beauty of combinatorial math and cultivate abstract summarization skills.	Word Problems
8	Calculation Strategies on Fractions, Decimals, and Percentages	Review the distributive law of multiplication. Understand the inverse application of distributive law of multiplication and master the tricks to extract common factors.	Numbers and Operations
9	Advanced Circle	Review the method of calculating circumference and area of a circle. Learn the method of calculating areas of sectors and annulus.	Geometry
10	Travel Word Problems of Boats	Distinguish the speed of the boat in the water when going downstream and upstream. Apply models to solve travel word problems of boats.	Word Problems
11	Advanced Extremum	Discuss advanced extremization problems that appear in different modules such as number theory, geometry, and combinatorics.	Combinatorics
12	Cubes and Cuboids	Understand rectangular prisms and cubes. Learn the calculation method of surface area and volume, and be able to complete some problems related to surface area and volume.	Geometry
13	Grids and Shifts	Understand grids, and learn the calculation methods of various shapes on square grid points and triangle grid points.	Geometry
14	Fractional Equations	Review the basic rules of equations and learn how to solve fractional coefficient equations.	Algebra and Sequence
15	Congruence Modulo	Understand the meaning of congruence, learn the properties of congruence, and learn to use the congruence theorem to solve related number theory problems.	Number Theory
16	Inductive Recursion	Find patterns out of figures. Study the Fibonacci Sequence. Apply the recursion of Fibonacci Sequence to complicated problems.	Combinatorics
17	Pythagorean Theorem	Learn the history of the Pythagorean Theorem. Understand the meaning of the Pythagorean theorem and the proof method. Memorize the common hook numbers and apply them to geometry problems.	Geometry
18	Scale	Review the conversion between common measurements of length in daily life. Understand the proportional scale and use it to solve a series of problems. Understand the changing relationship between length ratio and area ratio.	Word Problems

Syllabus for 5 Core+

2026 Spring

	Topics	Knowledge Points	Common Core
1	Ratio	1. Definition of Ratio 2. Writing Ratio 3. Equivalent Ratios	CCSS.6.RP.A.1
2	Rates	1. Definition of Rates 2. Unit Rates 3. Rate Word Problems	CCSS.6.RP.A.2
3	Applying Ratio and Rates	1. Representing Ratio and Rates 2. Proportion 3. Proportion Word Problems	CCSS.6.RP.A.3.A
4	Calculation Strategies of Fractions	1. Complement Method of Fractions 2. Distributive Law of Fractions 3. Extract Common Factors from Fractions	CCSS.6.NS.A.1
5	Equations	1. Equations with Whole Numbers 2. Equations with Fractions	CCSS.6.EE.C.9
6	Converting Measurement Systems	1. Conversion Factor 2. Conversion within Measurement Systems 3. Converting between Measurement Systems	CCSS.MATH.6.RP.A.3.B
7	Percents	1. Definition of Percents 2. Percents, Fractions and Decimals Conversion 3. Fast Calculation of Percents	CCSS.6.RP.A.3.C
8	Applying Percents	1. Finding the Percent of a Number 2. Find a Whole or a Part 3. Percent Word Problems	CCSS.6.RP.A.3.C
9	Mid Term Review		

	Topics	Knowledge Points	Common Core
10	Writing and Representing Equations	1. Definition of Independent and Dependent Variables 2. Table of Independent and Dependent Variables 3. Writing Equations from Table	CCSS.6.EE.C.9
11	Specified Operation	1. Comparing Operations 2. Simple Operations Related to the Position 3. Complicated Operations	—
12	Surface Area of Solid Figures	1. Nets and Surface Area 2. Surface Area of Prism and Pyramid	CCSS.6.G.A.4
13	Volume of Cube and Rectangular Prism	1. Volume of Cubes 2. Volume of Rectangular Prisms	CCSS.6.G.A.2
14	Volume Word Problems	1. Equations in Volume Formula 2. Solve Multistep Volume Problems	CCSS.6.G.A.2
15	Distance and Polygon in the Coordinate Plane	1. Finding Distance Between Two Points 2. Perimeter of Polygons in the Coordinate Plane 3. Area of Polygons in the Coordinate Plane	CCSS.6.G.A.3
16	Equation Word Problem	1. Writing Equations from Description in Word Form. 2. Using Unknown Letter to Represent Objects in Real World Problems. 3. Using Unknown Letter to Make and Solve Equations in Real World Problems.	CCSS.7.EE.B.3
17	Final Review		
18	Road to Pre-algebra	1. Number System 2. Algebraic Expressions	—

G5 Spring Syllabus

H



	Topic	Content	Common Core Standard
1	Three Views of Solid Figures	Identify the Three Views of Solid Figures Restore Solid Figures Based on the Three Views Calculate the Surface Area of Solid Figures Using Three Views	CC6.G
2	Rational Number Operations	Understand Rational Numbers Add and Subtract Negative Fractions Mixed Operations of Rational Numbers	CC7.NS
3	Dot Plot	Display Data with Dot Plot Interpret Dot Plot Calculate Mean and Median Using Dot Plot	CC6.SP
4	Divisibility Rules	Divisibility Rules for 2 and 5 Divisibility Rules for 4 and 25 Divisibility Rules for 3 and 9	CC6.NS
5	Mean Absolute Deviation	Recognize and Understand Variability Recognize and Calculate Mean Absolute Deviation (MAD) Apply MAD in Combination with Dot Plot	CC6.SP
6	Comprehensive Unit Conversion	Convert Various Metric Units Convert Various Customary Units Combine Unit Conversion with Geometry	CC6.RP
7	Comprehensive Area of Plane Figures	Review the Area of Common Plane Figures Calculate the Area of Rhombus Relationship Between Change in Side Length and Area	CC6.G
8	Area of Composite Figures	Calculate the Area of Irregular Figures by Division Method Calculate the Area of Irregular Figures by Completion Method Calculate the Area of Irregular Figures by Translation Method	CC6.G
9	Squares and Square Roots	Characteristics of Perfect Squares Calculate the Square Root Application of Squares in Area Calculation	CC7.NS
10	Inequalities	Recognize the Four Types of Inequality Relationships Represent Inequalities on the Number Line Solve Inequalities	CC6.EE
11	Distance-Time Graphs	Recognize Distance-Time Graphs Match Distance-Time Graphs According to Descriptions Compare Speeds Using Distance-Time Graphs	CC6.SP
12	Distance on the Coordinate Plane	Distance Between Points with the Same Horizontal Coordinate Distance Between Points with the Same Vertical Coordinate Calculate the Distance Between Points to Solve Real-World Problems	CC6.NS
13	Shapes on the Coordinate Plane	Mark Points on the Coordinate Plane to Form Figures Calculate the Perimeter of Figures on the Coordinate Plane Calculate the Area of Figures on the Coordinate Plane	CC6.G
14	Histograms	Display Data with Histogram Determine and Select Appropriate Intervals Interpret Histogram	CC6.SP
15	Multiplication and Division of Negative Integers	Multiply Negative Numbers Divide Negative Numbers Mixed Operations with Positive and Negative Integers	CC7.NS
16	Advanced Exponent Operations	Review Powers with Positive Bases Calculate Powers with Negative Bases Multiplication and Division of Powers	CC7.EE
17	Final Review 1	Comprehensive Calculation Exercises Ratio and Proportion Exercises Plane and Solid Geometry Exercises	CC6
18	Final Review 2	Algebraic Expressions and Equations Exercises Statistics and Probability Exercises Unit Conversion Exercises	CC6

G5 Spring Syllabus

Pre Algebra Accelerated



	Topic	Content	Module
1	Integrated Angles	Review fundamental angle theorems and calculate angles within complex geometric diagrams. Master solving triangle exterior angle problems through practical applications.	Geometry
2	Triangles, Quadrilaterals, and Circles	Solve advanced area problems involving parallelograms, triangles and the Pythagorean theorem. Explore circle-based figures and analyze polygon rolling motion paths.	Geometry
3	Advanced Efficiency Word Problems	Apply the relationship between workload, work time, and work efficiency to solve real-world problems. Learn to use equations to solve efficiency word problems. Master using equations to solve complex inflow and outflow problems.	Word Problems
4	System of Linear Equations	Understand systems of linear equations and express variables algebraically. Apply substitution and elimination methods to solve problems.	Algebra and Sequence
5	Real Numbers	Master mixed operations with radicals including cube roots, and establish fundamental understanding of real number classification. Perform complex multi-step calculations integrating absolute values, exponents, and nested radicals.	Numbers and Operations
6	Algebraic Expressions	Build foundational knowledge of algebraic terminology and standardized notation conventions. Identify monomial/polynomial structures and develop systematic simplification techniques.	Algebra and Sequence
7	Addition and Subtraction of Polynomials	Recognize like terms patterns and consolidate combination strategies. Synthesize distributive property applications with advanced expression simplification.	Algebra and Sequence
8	Multiplying and Dividing Polynomials	Execute monomial-based multiplication and division operations fluently. Master binomial multiplication through pattern recognition and FOIL method applications.	Algebra and Sequence
9	Operation Properties of Inequalities	Represent inequalities on number lines and master fundamental properties through operations. Apply inequality solving techniques to real-world scenario word problems.	Algebra and Sequence
10	Integrated Exponents	Strengthen exponential computation skills including negative exponents. Master scientific notation applications with negative bases and exponents through guided practice.	Numbers and Operations
11	More about Solid Figures	Learn the concepts of prisms, pyramids, and spheres, as well as their surface area and volume formulas.	Geometry
12	Immersing Objects in the Water	Review the volume formula of cubes, rectangular prisms, and cylinders. Learn about immersing objects in water (whole, half, overflowing), and be able to solve particular types of real-world problems.	Geometry
13	Congruent and Similar Figures	Understand the definitions and properties of congruent and similar figures, and apply them in simple cases. Learn the "Angle-Angle Similarity" criterion for similar triangles and become familiar with the process of proving geometric problems.	Geometry
14	Coordinate Plane and Functions	Calculate point-to-axis distances and map coordinate relationships. Graph functions efficiently and verify solution points on coordinate planes.	Algebra and Sequence
15	Linear Equations I	Define direct proportion relationships and graph proportional functions. Compare multiple proportional functions visually in shared coordinate systems.	Algebra and Sequence
16	Linear Equations II	Graph linear functions in standard form and determine slope using coordinate points. Analyze intercepts and identify axis intersection points systematically.	Algebra and Sequence
17	Linear Equations III	Derive linear equations using multiple point configurations. Investigate function intersections, parallelism, and quadrant characteristics.	Algebra and Sequence
18	Transformations in Coordinate Plane	Execute translations and symmetry transformations on geometric figures. Master rotational coordinate changes and function re-expression techniques.	Geometry



Syllabus for Pre-Algebra

2026 Spring

Honors



	Topic	Knowledge Point	Competition Topics		Topic	Knowledge Point	Competition Topics
1	Polynomials Enhancement	1. Adding and Subtracting of Polynomials 2. Multiplying Polynomials by a Monomial 3. Multiplying Binomials 4. Dividing Polynomials by a Monomial	8.EE.A	10	The Distance and Midpoint Formulas	1. The Distance Formula 2. Distance in Geometric Figure 3. The Midpoint Formula 4. Word Problems	8.G.B.8
2	Inequalities	1. Plotting Inequalities 2. Inequalities 3. Inequalities word problem	6.EE.B.5	11	Special Triangles	1. 45-45-90 and 30-60-90 Triangles 2. The Area of Equilateral Triangles 3. The Sine, Cosine and Tangent Ratios in a Triangle	8.G.B.7
3	System of Linear Equations	1. Indeterminate Equations 2. Testing Solutions 3. Substitute Elimination Method 4. Subtraction Elimination Method	8.EE.C.8	12	Elementary Statistics	1. Measure of Variation 2. Dot Plot & Box Plot 3. Histogram	7.SP.B.4
4	Relation and Function	1. Relation and Function 2. Evaluating Function 3. Graph of Function	7.RP.A.2	13	Population and Samples	1. Population and Samples 2. Random Sample and Biased Samples 3. Making Inference from Samples	7.SP.A.1
5	Linear Function Part 1: Direct Variation	1. Slope 2. Definition and Graph of Direct Variation 3. Properties of Direct Variation	8.F.A.1	14	Composite and Prime Factorization	1. Factors 2. Prime Factorization 3. GCF & LCM	6.NS.B.2-4
6	Linear Function Part 2: Definition and Graph	1. Function Form 2. Definition and Graph of Linear Equations 3. Slope and Intercept of Linear Equations 4. Slope Intercept Form	8.F.A.2	15	Addition and Multiplication Principles	1. Addition and Multiplication Principles 2. Factorial	7.SP.C.8
7	Linear Function Part 3: Writing Linear Equations	1. Writing Linear Equations 2. Properties of Linear Equations	8.F.A.3	16	Probability	1. Definition of Probability 2. Finding Probability 3. Experimental Probability	7.SP.C.5
8	Cube, Prism, Pyramid	1. The Surface Area and Volume of Cubes 2. The Surface Area and Volume of Prisms 3. The Surface Area and Volume of Pyramids	7.G.B.6	17	Theoretical Probability	1. Theoretical Probability 2. Two-way Table 3. Probability of Compound Events	7.SP.C.7
9	Cylinder, Cone and Sphere	1. The Surface Area and Volume of Cylinders 2. The Slant Height and Volume of Cones 3. The Volume of Spheres	8.G.C.9	18	Linear Equations Enhancement	1. Equations and Graphs of Direct Variations 2. Equations and Graphs of Linear Equations	8.F.A.1-3

Syllabus for Pre-Algebra

2026 Spring Challenge



	Topic	Knowledge Point
1	Tackle AMC 8 AR: Mean, Median and Mode	1. Definition of Mean, Median and Mode 2. Word Problems of Mean, Median and Mode in AMC 8
2	Monomials and Polynomials	1. Review of Algebraic Expressions 2. Monomial Definition 3. Polynomial Definition
3	Adding and Subtracting Polynomials	1. Ascending and Descending Order 2. Adding Polynomials 3. Subtracting Polynomials
4	Inequalities	1. Plotting Inequalities 2. Solving Inequalities 3. Inequalities word problem
5	System of Linear Equations	1. Indeterminate Equations 2. Testing Solutions 3. Substitute Elimination Method 4. Subtraction Elimination Method
6	Relation and Function	1. Relation and Function 2. Evaluating Function 3. Graph of Function
7	Linear Equation Part 1: Direct Variation	1. Slope 2. Definition and Graph of Direct Variation 3. Properties of Direct Variation
8	Linear Equation Part 2: Definition and Graph	1. Function Form 2. Definition and Graph of Linear Equations 3. Slope and Intercept of Linear Equations 4. Graph of Linear Function
9	Linear Equation Part 3: Writing Linear Equations	1. Slope Intercept Form 2. Writing Linear Equations 3. Properties of Linear Equations

	Topic	Knowledge Point
10	Cube, Prism, Pyramid	1. The Surface Area and Volume of Cubes 2. The Surface Area and Volume of Prisms 3. The Surface Area and Volume of Pyramids
11	Cylinder, Cone and Sphere	1. The Surface Area and Volume of Cylinders 2. The Surface Area and Volume of Cones 3. The Volume of Spheres
12	The Distance and Midpoint Formulas	1. The Distance Formula 2. Distance in Geometric Figure 3. The Midpoint Formula 4. Word Problems
13	Special Triangles and Trigonometric Ratios	1. 45-45-90 and 30-60-90 Triangles 2. The Sine, Cosine and Tangent Ratios in a Triangle
14	Permutation and Combination	1. Permutation 2. Combination 3. Casework
15	Applying Probability	1. Addition and Multiplication of Probability 2. Permutation, Combination and Probability 3. Geometric Probability
16	Geometric Sequences	1. Identify Geometric Sequences and the Common Ratio 2. The Rule of Geometric Sequences
17	Multiplying and Dividing Monomials and Polynomials	1. FOIL 2. Multiplying Binomials
18	Linear Equations Enhancement	1. Equations and Graphs of Direct Variations 2. Equations and Graphs of Linear Equations

Syllabus for Algebra 1 Vol.3

2026 Spring

Honors

	Topic	Knowledge Points	Common Core		Topic	Knowledge Point	Common Core
1	Piecewise-Defined Function	1. Writing Piecewise-Defined Functions with Function Notation 2. Finding Domain and Range 3. Evaluating and Graphing Piecewise-Defined Functions	HSF.IF.A.1-2 HSF.IF.B.4-5	10	Quadratic Equations II	1. Completing the Square 2. Solving Quadratic Equations by the Quadratic Formula 3. Using the Discriminant	HSA.REI.B.4
2	Linear Equations Enhancement	1. Basics and Properties of Linear Equations 2. Advanced Transformation of Linear Equations 3. Application of Linear Equations	8.F.B.4-5 HSF.IF.B.4	11	Quadratic Functions I	1. Definition of Quadratic Functions 2. Graphing Quadratic Functions 3. Properties of Quadratic Functions	HSF.LE.A.1-A.4 HSF.LE.B.5
3	Exponential Functions I	1. Definition of Exponential Functions 2. Writing and Graphing Exponential Growth Functions 3. Comparing the Graphs of Exponential Growth Functions 4. Modeling with Exponential Growth Functions	HSF.LE.A.1-A.4 HSF.LE.B.5	12	Quadratic Functions II	1. Vertex Form of Quadratic Functions 2. Intercept Form of Quadratic Functions 3. Transformation of Quadratic Functions	HSF.LE.A.1-A.4 HSF.LE.B.5 HSA.REI.D.10
4	Exponential Functions II	1. Writing and Graphing Exponential Decay Functions 2. Comparing the Graphs of Exponential Decay Functions 3. Modeling with Exponential Decay Functions	HSF.LE.A.1-A.4 HSF.LE.B.5	13	Quadratic Functions III	1. Solving Quadratic Equations by Graphing 2. Modeling with Quadratic Functions	HSF.LE.A.1-A.4 HSF.LE.B.5 HSA.REI.D.10
5	Rational Expressions I	1. Simplifying Rational Expressions 2. Multiplying and Dividing Rational Expressions	HSA.APR.A.1 HSA.APR.D.7	14	Operations with Radicals and Radical Equations	1. Operations with Radicals Expressions 2. Graph Functions Involving Square Roots 3. Solve Radical Equations	HSA.SSE.B.3 HSA.REI.B.3
6	Rational Expressions II	1. Adding and Subtracting with Like Denominators 2. Adding and Subtracting with Unlike Denominators	HSA.APR.A.1 HSA.APR.D.7	15	Complex Numbers	1. Definition of Imaginary Numbers 2. Solving Radicals with Negative Radicants 3. Definition of Complex Numbers 4. Adding and Subtracting of Complex Numbers	HSN.CN.A.1-2 HSN.CN.B.5
7	Proportions and Rational Equations	1. Cross Multiply 2. Multiply by the LCD 3. Factor First, then Multiply by the LCD 4. Word Problem	HSA.SSE.A.1 HSA.SSE.B.3 HSA.REI.B.3	16	Basics of Statistics	1. Dot Plots and Box Plots 2. Scatter Plots and Correlation 3. The Best-Fit Line	HSS.ID.A.1 HSS.ID.B.6
8	Inverse Variation	1. Direct Proportional and Inverse Proportional Relationships 2. Graph of Inverse Variation 3. Equations of Inverse Variation 4. Word Problems	HSA.CED.A.2	17	Arithmetic and Geometric Sequences	1. Identify Arithmetic Sequences and the Common Difference 2. Identify Geometric Sequences and the Common Ratio 3. Recursive and Explicit Formulas of Arithmetic Sequences 4. Recursive and Explicit Formulas of Geometric Sequences	HSF.LE.A.2
9	Quadratic Equations I	1. Solving Quadratic Equations by Finding Square Roots 2. Solving Quadratic Equations by Perfect Square Pattern 3. Solving Quadratic Equations by Cross Method	HSA.CED.A.1 HSA.REI.B.4	18	Quadratic Function Enhancement	1. Properties of Quadratic Functions 2. Different Forms of Quadratic Functions 3. Applications of Quadratic Functions	HSF.LE.A.1-A.4 HSF.LE.B.5 HSA.REI.D.10

Syllabus for Algebra 1 to Geometry

2026 Spring

	Topic	Knowledge Points	Common Core		Topic	Knowledge Point	Common Core
1	Linear Equations Enhancement	1. Basics and Properties of Linear Equations 2. Advanced Transformation of Linear Equations 3. Application of Linear Equations	8.F.B.4-5 HSF.IF.B.4			1. Identify Arithmetic Sequences and the Common Difference 2. Identify Geometric Sequences and the Common Ratio 3. Recursive and Explicit Formulas of Arithmetic Sequences 4. Recursive and Explicit Formulas of Geometric Sequences	
2	Piecewise-Defined Function	1. Writing Piecewise-Defined Functions with Function Notation 2. Finding Domain and Range 3. Evaluating and Graphing Piecewise-Defined Functions	HSF.IF.A.1-2 HSF.IF.B.4-5	10	Arithmetic and Geometric Sequences		HSF.LE.A.2
3	Quadratic Functions I	1. Definition of Quadratic Functions 2. Graphing Quadratic Functions 3. Properties of Quadratic Functions 4. Solving Quadratic Equations by Graphing	HSF.LE.A.1-A.4 HSF.LE.B.5	11	Definition and Representation of Sets	1. Definition of Sets 2. Representation of Sets	
4	Quadratic Functions II	1. Vertex Form of Quadratic Functions 2. Intercept Form of Quadratic Functions 3. Transformation of Quadratic Functions	HSF.LE.A.1-A.4 HSF.LE.B.5 HSA.REI.D.10	12	Relation and Operation of Sets	1. Relation of Sets 2. Operations of Sets	
5	Quadratic Functions III	1. Solve Quadratic Inequalities 2. Modeling with Quadratic Functions	HSF.LE.A.1-A.4 HSF.LE.B.5 HSA.REI.D.10	13	Statistics	1. Dot Plots and Box Plots 2. Scatter Plots and Correlation 3. The Best-Fit Line	HSS.ID.A.1 HSS.ID.B.6
6	Exponential Functions I	1. Definition of Exponential Functions 2. Writing and Graphing Exponential Growth Functions 3. Comparing the Graphs of Exponential Growth Functions 4. Modeling with Exponential Growth Functions	HSF.LE.A.1-A.4 HSF.LE.B.5	14	Essentials of Geometry	1. Points, Lines and Planes 2. Segments and Rays and Distance 3. Angles	HSG.CO.A.1
7	Exponential Functions II	1. Writing and Graphing Exponential Decay Functions 2. Comparing the Graphs of Exponential Decay Functions 3. Modeling with Exponential Decay Functions	HSF.LE.A.1-A.4 HSF.LE.B.5	15	Deductive Reasoning	1. Reason Use Properties from Algebra 2. Proving Theorems	HSG.CO.C.9
8	Complex Numbers	1. Definition of Imaginary Numbers 2. Solving Radicals with Negative Radicants 3. Definition of Complex Numbers 4. Adding and Subtracting of Complex Numbers	HSN.CN.A.1-2 HSN.CN.B.5	16	Theorems about Angles and Perpendicular Lines	1. Special Pairs of Angles 2. Perpendicular Lines 3. Planning a Proof	HSG.CO.A.1
9	Complex Solutions of Quadratic Equations	1. Review on the Methods of Solving Quadratic Equations 2. Solving Quadratic Equations with Complex Numbers	HSN.CN.C.7-8	17	Applications of Linear Equations	1. The Area of Triangles in Linear Equations 2. Determine the Linear Equation with Given Area of the Triangle 3. Determine the Linear Equation with the Ratio of the Triangles	HSA.REI.D.12
				18	Properties of Proportion, Similar Polygons	1. Review of Ratio and Proportion 2. Properties of Proportion 3. Similar Polygons	HSG.SRT.B.5



Syllabus for Geometry Vol.2

2026 Spring

Honors



	Topic	Knowledge Point
1	Angles in Circles - Part 1	1. Central Angles 2. Inscribed Angles
2	Position of Points and Lines with respect to a Circle	1. Position of Points with Respect to a Circle 2. Position of Lines with Respect to a Circle
3	Power of a Point	1. Intersecting Chords Theorem 2. Tangent-Secant Theorem 3. Intersecting Secants Theorem
4	Angles in Circles - Part 2	1. Cyclic Quadrilateral 2. Other Angles
5	Prisms and Pyramids	1. Prisms 2. Pyramids
6	Cylinders and Cones	1. Cylinders 2. Cones
7	Similar Solids and Spheres	1. Similar Solids 2. Spheres

	Topic	Knowledge Point
8	Transformations-Part 1	1. Mapping and Functions 2. Reflections
9	Transformations-Part 2	1. Translation 2. Rotation 3. Dilation
10	Composition	1. Composite of Mappings 2. Inverses and the Identity
11	Coordinate Proofs	1. Organizing Coordinate Proofs 2. Coordinate Proofs
12	Equation of a Circle and Equations of Parabolas	1. Equation of a Circle 2. Equations of Parabolas
13	Permutation and Combination	1. Definition of Permutations and Combinations 2. Methods of Permutations and Combinations
14	Probability-Part 1	1. Sample Spaces 2. Venn Diagrams 3. Addition Rule
15	Probability-Part 2	1. Conditional Probability 2. Multiplication Rule

>>>>> Syllabus for Algebra 2 Vol.1

2026 Spring

	Topic	Knowledge Point	Common Core		Topic	Knowledge Point	Common Core
1	Definition and Representation of Sets	1. Definition of Sets 2. Representation of Sets		8	Quadratic Equations - Complex number involved	1. Computing the Square Roots (Complex Numbers Involved) 2. Completing the Square (Complex Numbers Involved) 3. Solving Quadratic Equations by the Quadratic Formula (Complex Number Involved) 4. Vieta's Formula	HSN.CN.7-9 HSA.REI.4
2	Relation and Operation of Sets	1. Relation of Sets 2. Operations of Sets		9	Polynomial Functions-Part 1	1. Definition of Polynomial Functions and Standard Form 2. Operation of Polynomials 3. Review of Factoring Polynomials	HSF.IF.7-9 HSF.BF.1-4
3	Absolute Equations and Inequalities	1. Simplifying the Absolute Values 2. Solving Absolute Equations 3. Solve Complicated Absolute-Value Equations 4. Solving an Absolute-Value Inequalities 5. Solve Complicated Absolute-Value Inequalities	HSA.REI.3	10	Polynomial Functions-Part 2	1. Roots of Polynomial Functions 2. End Behavior of Polynomial Functions 3. Local Maximum & Minimum and Turning Points 4. Solve Polynomial Inequalities	HSF.IF.7-9 HSF.BF.1-4
4	Piecewise-Defined Functions	1. Graphing Piecewise-Defined Functions 2. Applications of Piecewise-Defined Functions 3. Step Functions & Greatest Integer Function 4. Absolute Value Function 5. Transformations of Absolute Value Parent Functions		11	Operations and Properties of Functions	1. Function Operations 2. Composition of Functions 3. Inverse Functions 4. Even and Odd Functions	HSF.IF.7.e HSF.IF.8.b HSF.LE.1-5
5	Matrix Operations and Solving Equations	1. Introduction to Matrices 2. Matrix Operations 3. Multiplying Matrices 4. Inverse Matrices 5. Determinants and Cramer's Rule	HSN.VM.6-12	12	Exponential Functions	1. The Definition and Properties of Exponential Functions 2. Translations of Exponential Functions 3. Reflections of Exponential Functions	HSF.IF.7.e
6	Arithmetic Sequences & Geometric Sequences	1. Definition and General Formula of Arithmetic Sequences 2. Arithmetic Series 3. Sigma Notation 4. Definition and General Formula of Geometric Sequences 5. Geometric Series	HSF.LE.2	13	Logarithms	1. Definition of Logarithms 2. Properties of Logarithms 3. Conversion between Exponent and Logarithm 4. Change of Base Formula	HSF.IF.7.e
7	Complex Numbers	1. Definition of Imaginary Numbers and Complex Numbers 2. Operations with Complex Numbers and the Conjugate 3. Complex Plane 4. Factoring Complex Numbers	HSN.CN.1-6	14	Logarithmic Functions	1. Definition of Logarithmic Functions 2. The Graphs of Logarithmic Functions 3. Properties of Logarithmic Functions	
				15	Exponential and Logarithm Equations	1. Exponential Equations 2. Solve Logarithmic Equations 3. Solve Exponential and Logarithmic Inequalities	



Syllabus for AMC10 Introduction

2026 Spring



	Topic	Concepts		Topic	Concepts
1	Calculation Methods	1. Grouping 2. Telescoping 3. Splitting 4. Substitution 5. Negative Exponent 6. Fractional Exponent	10	Advanced Prime and Composite Numbers	1. Determination of prime numbers 2. Perfect Squares 3. Perfect Cubes
2	Divisibility	1. Divisibility Rules 2. Odd numbers and Even numbers 3. Divisibility and Counting	11	Place Value and Congruence	1. Place Value 2. Number Bases 3. Basics of Congruence
3	Greatest Common Factor and Least Common Multiple	1. GCF and LCM 2. Short Division Method 3. AMC 10 Comprehensive Problems	12	Quadratic Equations	1. Solving Quadratic Equations by Finding Square Roots 2. Solving Quadratic Equations in Factored Form 3. Completing the Square 4. Solving Quadratic Equations by the Quadratic Formula 5. Sums and Products of Roots of Quadratic Equations
4	Equations and System of Equations	1. Solving Systems of Linear Equations 2. Linear Systems in Three Variables 3. Special Techniques	13	Rational Expressions	1. Simplifying Rational Expressions 2. Multiplying and Dividing Rational Expressions 3. Adding and Subtracting with Like Denominators 4. Adding and Subtracting with Unlike Denominators
5	Inequalities	1. Properties of Inequalities 2. Solving Systematic and Complicated Inequalities	14	Rational Equations	1. Cross Multiply 2. Multiply by the LCD 3. Factor First, then Multiply by the LCD 4. Word Problems
6	Advanced Equations of Linear Functions	1. Points on Linear Equations 2. Slope-Intercept Form and Point-Slope Form 3. AMC Problems	15	Complicated Absolute-Value Equations and Inequalities	1. Solving Absolute-Value Equations 2. Solving Absolute-Value Quadratic Equations 3. Solving Absolute-Value Inequalities
7	Transformations and applications of Equations of Linear Functions	1. Translation and Symmetry 2. Perpendicular Lines 3. Symmetry about Any Line 4. Rotation about the Origin 5. The Area of Triangles in Linear Equations	16	Quadratic Functions	1. Definition of Quadratic Functions 2. Graphing Quadratic Functions 3. Properties of Quadratic Functions 4. Different Forms of Equations 5. Solve Quadratic Inequalities 6. Word Problems
8	Polynomial Multiplication Formulae	1. Difference of Squares and Perfect Square Formula 2. Perfect Square on Multiple Variables 3. Cubic Formulae and Pascal's Triangle	17	Counting Principle	1. Addition and Multiplication Principles 2. Inclusive-Exclusive Principles 3. Pigeonhole Principle
9	Factorization	1. Factoring by GCF 2. Factoring by Special Products 3. Factoring Complicated Polynomials 4. Factoring by Cross Method 5. Use different Method to Factor Complicated Polynomials	18	Permutation and Combination	1. Enumeration Methods 2. Binding Methods 3. Filling in the Blanks Method 4. Stars and Bars Method



Syllabus for AMC10 AIME Camp

2026 Spring



	Topic	Concepts
1	Exponents and Expressions	1. Techniques for Solving Exponent Problems 2. Construct the Squares Formula 3. Substitution Method in Rational Equations 4. Casework of the Absolute Value
2	Factorization of Polynomials	1. Factoring by GCF 2. Factoring by Special Patterns 3. Factoring by Cross Method 4. Factoring by Grouping 5. Factoring by Completing Squares 6. Simon's Favorite Factoring Trick
3	Sequences(I)	1. Applications of Arithmetic Sequences 2. The Sum of Geometric Series
4	Sequences(II)	2. Applications of Geometric Sequences 1. Comprehensive Application of Arithmetic and Geometric Sequence 2. Recursive Sequence
5	Triangles	1. Pythagorean Theorem 2. Properties of Special Triangles 3. Triangle Inequalities
6	Congruence Triangles	1. Properties of Angle Bisectors 2. Equal Altitude Models 3. "K" Models 4. Constructing Congruence Techniques
7	Similar Triangles	1. Similar Triangles: 'A' and '8' Models 2. Similar Triangles in Quadrilaterals
8	Regular Polygon	1. Constructing Right Triangles 2. Chordal Graph 3. Folding Problems 4. Regular Polygons
9	Circle	1. Theorems of Chords 2. Position of Points with respect to a Circle 3. Position of Lines with respect to a Circle

	Topic	Concepts
10	The Properties of Integers	1. Place Values 2. Properties of Divisibilities 3. Divisibility Rules
11	Prime Factorizations	1. Prime Factorization 2. The Total Number of Factors of a Natural Number 3. The Number of Even and Odd Factors 4. Relationships of GCF and LCM
12	Factors and Multiples	1. The Sum of Factors 2. Casework in GCF and LCM 3. The Properties of Square Numbers
13	Modular Arithmetic (I)	1. Modulo and Congruence 2. Addition and Subtraction 3. Multiplication and Exponentiation 4. Remainder Problems
14	Modular Arithmetic (II)	1. Properties of Congruence Modulo 2. Congruence and Sequence Problems 3. Fermat's Little Theorem 4. Divide by the Remainder of 9
15	Counting (I)	1. Addition and Multiplication Principles 2. Inclusive-Exclusive Principles 3. Pigeonhole Principle
16	Counting (II)	1. Lexicographic ordering 2. Tree Diagram
17	Combinatorics	1. Sports Competition 2. Logical Reasoning
18	Classical Probabilities	1. Classical Probabilities 2. Complementary Events 3. Dice Problems 4. Counting and Probabilities

Syllabus for Precalculus Vol.1

Spring 2026



	Topic	Content
1	Relation and Functions	1. Relations and Functions 2. Domain and Range 3. Increasing and Decreasing 4. Parity of a Function
2	Rate of Change	1. Rate of Change 2. Rate of Change in Linear Functions 3. Rate of Change in Quadratic Functions
3	Polynomial Functions	1. Relative and Absolute Extrema 2. Zeros of Polynomial Functions 3. End Behavior and Polynomial Functions 4. Graph Polynomial Functions 5. Polynomial Inequalities
4	Rational Expressions and Rational Functions	1. Addition and Subtraction of Rational Expressions 2. Multiplication and Division of Rational Expressions 3. Rational Function and Zeros
5	Graph of Rational Functions	1. Rational Functions and Vertical Asymptotes 2. Rational Functions and End Behavior 3. Graph Rational Functions
6	Rational Equations and Inequalities	1. Rational Equations 2. Rational Inequalities
7	Parent Functions	1. Basic Functions 2. Transformation of Basic Functions 3. Function Modeling

	Topic	Content
8	Composition of Functions and Inverse Functions	1. Composition of Functions 2. Inverse Functions
9	Exponential Functions	1. Exponential Functions 2. Transformation of Exponential Function 3. Exponential Function Modeling
10	Logarithmic Functions	1. Logarithmic Functions 2. Transformation of Logarithmic Functions 3. Logarithmic Function Modeling
11	Exponential and Logarithmic Equation and Inequalities	1. Exponential and Logarithmic Equation 2. Exponential and Logarithmic Inequalities 3. Inverse Equations
12	Sinusoidal Functions	1. Sinusoidal Functions 2. Transformations of Sinusoidal Functions 3. Modeling with Sinusoidal Functions
13	The Tangent Function	1. The Tangent Functions 2. Inverse Trigonometric Functions 3. The Secant, Cosecant and Cotangent Functions
14	Trigonometric Identities	1. Pythagorean Identity 2. Angle Addition Formulas 3. Double Angle Formulas
15	Trigonometric Equations and Inequalities	1. Trigonometric Equations 2. Trigonometric Inequalities



Syllabus for Precalculus Vol.2



2026 Spring

	Topic	Knowledge Point		Topic	Knowledge Point
1	Modeling with Trigonometric Functions	1. Solving Problems Using Trigonometric Functions 2. Modeling with Trigonometric Functions	9	Transformation of Matrices	1. Linear Transformations and Matrices 2. Matrices as Functions 3. Matrices Modeling Context
2	Vectors	1. Definition of Vectors 2. Properties of Vectors 3. Finding Angles between Two Vectors	10	The Binomial Theorem	1. Pascal's Triangle 2. The Binomial Theorem
3	Polar Functions	1. Polar Coordinates 2. Graph Polar Functions 3. Rates of Change in Polar Functions	11	Sequences-Part 1	1. Arithmetic and Geometric Sequence 2. Recursive Sequences 3. Sequences and Functions
4	Complex Numbers and Polar Functions	1. Review of Complex Numbers 2. Complex Numbers and Polar Functions	12	Convergence and Divergence	1. Convergence and Divergence 2. Comparison Principle 3. Properties of Sequences 4. Monotone Convergence Theorem
5	Parametric Functions	1. Parametric Functions 2. Rate of Change and Parametric Functions	13	Limits	1. Definition of Limits 2. Estimating Limits 3. Determine Limits
6	Lines, Circles and Parabolas	1. Parametrically Defined Circles and lines 2. Parabolas 3. Implicitly Defined Functions	14	Continuity	1. Discontinuities 2. Define Continuity 3. Limits and Asymptotes
7	Ellipse and Hyperbola	1. Ellipses 2. Hyperbolas	15	Introduction to Derivatives	1. Definition of Derivatives 2. Estimate Derivatives 3. Differentiability and Continuity
8	Operation of Matrices	1. Operation of Matrices 2. The Inverse and Determinant of a Matrix			