BPS MATHEMATICS

Middle School
Grades 6-9

Mathematics Learning: Essential Goals & Objectives

1- Goals:

The essential goals of learning mathematics are for students to understand that mathematics is a powerful tool/or describing and analyzing the world, a highly effective tool/or solving real world problems, and a way of thinking in a logical and critical manner- far beyond seeing it as a series of facts, formulas and equations to be memorized.

2 – Concepts and Competencies:

Learners should:

- Develop a **Deep Understanding** of the concepts of **Number Systems and Operations,** on whole numbers, fractions and decimals, and apply them in exploring and solving real-world problems

- Understand the basic **Algebraic Thinking** skills and apply them to analyze and understand the structures of the Number Systems, in preparation for the study of Algebra in the Middle school.

- Understand and practice the **Measurement and the Data** collection, analysis, and application.

- Understand the basic elements of **Geometry** and relations through the exploration of the physical world, identification and classification of shapes of objects and their properties and spatial relationships.

"Math is like going to the gym for your brain. It sharpens your mind." Danica McKellar

GRADE 6	STRAND 1 Numbers & systems	STRAND 2 Algebraic thinking & operations	STRAND 3 Measurements & data	STRAND 4 Space & geometry
	Apply and extend previous understandings of multiplication and division to divide fractions by fractions.	Ratios and Proportional Relations. Understand ratio concepts and use ratio reasoning to solve problems.	Solve real-world and mathematical problems involving angle measure, area, surface area, and volume.	Draw, construct and describe geometrical figures and describe the relationships between them.
	Compute fluently with multi-digit numbers and find common factors and multiples	Expressions and Equations: Apply and extend previous understandings of arithmetic to algebraic expressions	Statistics and Probability: Develop understanding of statistical variability	Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures
	Apply and extend previous understandings of numbers to the system of rational numbers.	Reason about and solve one-variable equations and inequalities	Summarize numerical data sets and describe their various distributions.	
		Represent and analyze quantitative relationships between dependent and independent variables		

GRADE 7	STRAND 1 Numbers & Systems	STRAND 2 Algebraic Thinking & Operations	STRAND 3 Measurements & Data	STRAND 4 Space & geometry
	Calculate with fractions and use them to solve problems	Analyze proportional relationships and use them to solve real-world and mathematical problems	Use random sampling to draw inferences about a population.	Draw, construct, and describe geometrical figures and describe the relationships between them.
	Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers	Expressions & Equations: Use properties of operations to generate equivalent expressions.	Draw informal comparative inferences about two populations.	Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.
		Solve real-life and mathematical problems using numerical and algebraic expressions and equations		

GRADE 8	STRAND 1 Numbers & systems	STRAND 2 Algebraic thinking & operations	STRAND 3 Measurements & data	STRAND 4 Space & geometry
	Understand that there are numbers that are not rational, and approximate them by rational numbers.	Understand the connections between proportional relationships, lines, and linear equations	Investigate patterns of association in bivariate data	Understand congruence and similarity using physical models, transparencies, or geometry software
		Analyze and solve linear equations and pairs of simultaneous linear equations		Understand and apply the Pythagorean Theorem
		Define, evaluate and compare functions		Solve real-world and mathematical problems involving measures and volume of cylinders, cones, spheres.
		Use functions to model relationships between quantities		

GRADE 9	STRAND 1 Numbers & systems	STRAND 2 Algebraic thinking & operations	STRAND 3 Measurements & data	STRAND 4 Space & geometry
	Write equivalent forms of algebraic expressions to solve problems	Write equivalent forms of algebraic expressions to solve problems	Measurements in geometric figures	Elements of Euclidean Geometry: Point, line and circle
	Identify and use number sets. Operate on sets and number sets	Use formulas and algebraic expressions, including iterative and recursive forms, to model and solve problems.	Reason quantitatively and use units to solve problems.	Geometric Proof by Deductive Reasoning
	Use properties of rational and irrational numbers	Equations and Functions: Use linear functions or inequalities to model and solve problems	Data, statistics and probability	Coordinate Geometry in a Cartesian set plane
	Extend the properties of exponents to rational exponents	Understand the concept of a function and use function notation.	Summarize, represent, and interpret data on a single count or measurement variable.	
		Interpret functions that arise in applications in terms of the context.	Summarize, represent, and interpret data on two categorical and quantitative variables.	
		Construct and compare linear, quadratic and exponential models and solve problems	Construct and compare linear, quadratic, and exponential models and solve problems:	