Math Syllabus

GRADES 3 & 4

1. Number & Operations in Base Ten

- Use place value understanding and properties of operations to perform multi-digit arithmetic.
- Fluently add and subtract within 1000.

2. Operations & Algebraic Thinking

- Solve problems involving the four operations, and identify and explain patterns in arithmetic.
- Gain familiarity with factors and multiples.

3. Fractions

- Understand decimal notation for fractions, and compare decimal fractions.
- Develop understanding of fractions as numbers.
- Represent fractions on a number line diagram.

4. Measurement & Data

- Represent and interpret data
- Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.
- Geometric measurement: understand concepts of angle and measure angles.

5. Geometry

- Reason with shapes and their attributes.
- Draw and identify lines and angles, and classify shapes by properties of their lines and angles.

Math Syllabus

GRADES 5 & 6

1. Ratios & Proportional Relationships

- Understanding ratio concepts and using ratio reasoning to solve problems.

2. The Number System

- Performing operations with multi-digit whole numbers and with decimals to hundredths.
- Applying and extending previous understandings of multiplication and division to divide fractions by fractions.

3. Expressions and Equations (intro)

- Applying and extending previous understandings of arithmetic to algebraic expressions.
- Reasoning about and solving one-variable equations and inequalities.

4. Geometry & measurement

- Solve real-world and mathematical problems involving area, surface area, and volume.

5. Statistics

- Measures of center & variability; dot plots/histograms/box plots; statistical questions; sample vs population (intro).

Math Syllabus

GRADES 7 & 8

1. Ratios & Proportional Relationships

- Proportional relationships: scale drawings; constant of proportionality; percent increase/decrease; slope as rate of change.
- Analyze proportional relationships and use them to solve real-world and mathematical problems.

2. Linear expressions & equations

- Multi-step equations/inequalities; rational coefficients; scientific notation (operations & applications).
- Understand the connections between proportional a-b-c relationships, lines, and linear equations.
- Analyze and solve linear equations and pairs of simultaneous linear equations.

3. Functions

- Define/compare/evaluate; linear vs non-linear; y=mx+b models.
- Use functions to model relationships between quantities.

4. Geometry

- Angles/triangles; similarity & congruence via transformations; Pythagorean Theorem (distance on coordinate plane); volume of cylinders, cones, spheres.
- Understand congruence and similarity using physical models, transparencies, or geometry software.
- Understand and apply the Pythagorean Theorem.
- Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.

5. Statistics & probability

- Sampling; two-way tables; experimental vs theoretical probability; chance processes.
- Use random sampling to draw inferences about a population.
- Draw informal comparative inferences about two populations.
- Investigate chance processes and develop, use, and evaluate probability models.

6. The Number System

- Operations with rational numbers; integer exponents; roots; irrational numbers & decimal expansions.
- Know that there are numbers that are not rational, and approximate them by rational numbers.

Math Syllabus

GRADES 9 & 10

1. Linear functions & modeling

- Domain/range; slope-intercept/point-slope; piecewise; linear inequalities; systems (graph/alg).
- Understanding the concept of a function and using function notation, interpreting functions that arise in applications in terms of the context, and analyzing functions using different representations.

2. Quadratics

- Factoring; completing the square; quadratic formula; vertex/standard forms; transformations; applications.

3. Exponentials

- Exponent rules; exponential growth/decay; geometric sequences; compare linear vs exponential.

4. Data analysis & inference (Alg I)

- Scatterplots; correlation; residuals; fit & interpret linear/quadratic/exponential models; sampling bias.

5. Geometry

- Congruence & similarity: rigid motions; proofs (two-column/flow); similar triangles; coordinate proofs.
- Experimenting with transformations in the plane, understanding congruence in terms of rigid motions, proving geometric theorems, and making geometric constructions.

6. Right triangles & trig

- Sine/cosine/tangent; solving right triangles; special triangles; applications.

7. Coordinate geometry

- Circles (equation, radius/center), distance/midpoint; partitioning a segment; basic transformations & dilations.

Math Syllabus

GRADES 11 & 12

1. Polynomial functions
- End behavior; zeros & multiplicity; factoring; long/synthetic division; polynomial equations & modeling.

2. Rational functions
- Asymptotes & holes; graph behavior; solving rational equations; applications.

3. Exponential & logarithmic functions
- Inverse relationship; log laws; solving exp/log equations; growth/decay & finance (compound interest).

4. Trigonometry (unit circle)
- Radians; trig functions & graphs; identities; solving trig equations; inverse trig; applications (law of sines/cosines optional here or Geo).

5. Sequences & series
- Arithmetic/geometric; sigma notation; partial sums; binomial theorem (expansions, nCr).

6. Probability & statistics
- Permutations/combinations; conditional probability; independence; normal distributions & z-scores; margin of error (conceptual).

7. Analytic geometry & advanced topics
- Conics (parabola/ellipse/hyperbola); parametric & polar (optional); vectors & matrices (optional).

8. Intro to calculus (Introductory Concepts)
- Limits (conceptual & notation), average vs instantaneous rate of change, derivative ideas, area under curve.