

**Mathematics**  
**Grade-Level Expectations: Grade 8**

**Number and Number Relations**

1. Compare rational numbers using symbols (i.e.,  $<$ ,  $\leq$ ,  $=$ ,  $\geq$ ,  $>$ ) and position on a number line (N-1-M) (N-2-M)
2. Use whole number exponents (0-3) in problem-solving contexts (N-1-M) (N-5-M)
3. Estimate the answer to an operation involving rational numbers based on the original numbers (N-2-M) (N-6-M)
4. Read and write numbers in scientific notation with positive exponents (N-3-M)
5. Simplify expressions involving operations on integers, grouping symbols, and whole number exponents using order of operations (N-4-M)
6. Identify missing information or suggest a strategy for solving a real-life, rational-number problem (N-5-M)
7. Use proportional reasoning to model and solve real-life problems (N-8-M)
8. Solve real-life problems involving percentages, including percentages less than 1 or greater than 100 (N-8-M) (N-5-M)
9. Find unit/cost rates and apply them in real-life problems (N-8-M) (N-5-M) (A-5-M)

**Algebra**

10. Write real-life meanings of expressions and equations involving rational numbers and variables (A-1-M) (A-5-M)
11. Translate real-life situations that can be modeled by linear or exponential relationships to algebraic expressions, equations, and inequalities (A-1-M) (A-4-M) (A-5-M)
12. Solve and graph solutions of multi-step linear equations and inequalities (A-2-M)
13. Switch between functions represented as tables, equations, graphs, and verbal representations, with and without technology (A-3-M) (P-2-M) (A-4-M)
14. Construct a table of  $x$ - and  $y$ -values satisfying a linear equation and construct a graph of the line on the coordinate plane (A-3-M) (A-2-M)
15. Describe and compare situations with constant or varying rates of change (A-4-M)
16. Explain and formulate generalizations about how a change in one variable results in a change in another variable (A-4-M)

**Measurement**

17. Determine the volume and surface area of prisms and cylinders (M-1-M) (G-7-M)
18. Apply rate of change in real-life problems, including density, velocity, and international monetary conversions (M-1-M) (N-8-M) (M-6-M)
19. Demonstrate an intuitive sense of the relative sizes of common units of volume in relation to real-life applications and use this sense when estimating (M-2-M) (G-1-M)
20. Identify and select appropriate units for measuring volume (M-3-M)
21. Compare and estimate measurements of volume and capacity within and between the U.S. and metric systems (M-4-M) (G-1-M)
22. Convert units of volume/capacity within systems for U.S. and metric units (M-5-M)

**Geometry**

23. Define and apply the *terms measure, distance, midpoint, bisect, bisector, and perpendicular bisector* (G-2-M)
24. Demonstrate conceptual and practical understanding of symmetry, similarity, and congruence and identify similar and congruent figures (G-2-M)
25. Predict, draw, and discuss the resulting changes in lengths, orientation, angle measures, and coordinates when figures are translated, reflected across horizontal or vertical lines, and rotated on a grid (G-3-M) (G-6-M)
26. Predict, draw, and discuss the resulting changes in lengths, orientation, and angle measures that occur in figures under a similarity transformation (dilation) (G-3-M) (G-6-M)

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27. Construct polyhedra using 2-dimensional patterns (nets) (G-4-M)
28. Apply concepts, properties, and relationships of adjacent, corresponding, vertical, alternate interior, complementary, and supplementary angles (G-5-M)
29. Solve problems involving lengths of sides of similar triangles (G-5-M) (A-5-M)
30. Construct, interpret, and use scale drawings in real-life situations (G-5-M) (M-6-M) (N-8-M)
31. Use area to justify the Pythagorean theorem and apply the Pythagorean theorem and its converse in real-life problems (G-5-M) (G-7-M)
32. Model and explain the relationship between the dimensions of a rectangular prism and its volume (i.e., how scale change in linear dimension(s) affects volume) (G-5-M)
33. Graph solutions to real-life problems on the coordinate plane (G-6-M)

**Data Analysis, Probability, and Discrete Math**

34. Determine what kind of data display is appropriate for a given situation (D-1-M)
35. Match a data set or graph to a described situation, and vice versa (D-1-M)
36. Organize and display data using circle graphs (D-1-M)
37. Collect and organize data using box-and-whisker plots and use the plots to interpret quartiles and range (D-1-M) (D-2-M)
38. Sketch and interpret a trend line (i.e., line of best fit) on a scatterplot (D-2-M) (A-4-M) (A-5-M)
39. Analyze and make predictions from discovered data patterns (D-2-M)
40. Explain factors in a data set that would affect measures of central tendency (e.g., impact of extreme values) and discuss which measure is most appropriate for a given situation (D-2-M)
41. Select random samples that are representative of the population, including sampling with and without replacement, and explain the effect of sampling on bias (D-2-M) (D-4-M)
42. Use lists, tree diagrams, and tables to apply the concept of permutations to represent an ordering with and without replacement (D-4-M)
43. Use lists and tables to apply the concept of combinations to represent the number of possible ways a set of objects can be selected from a group (D-4-M)
44. Use experimental data presented in tables and graphs to make outcome predictions of independent events (D-5-M)
45. Calculate, illustrate, and apply single- and multiple-event probabilities, including mutually exclusive, independent events and non-mutually exclusive, dependent events (D-5-M)

**Patterns, Relations, and Functions**

46. Distinguish between and explain when real-life numerical patterns are linear/arithmetic (i.e., grows by addition) or exponential/geometric (i.e., grows by multiplication) (P-1-M) (P-4-M)
47. Represent the  $n^{\text{th}}$  term in a pattern as a formula and test the representation (P-1-M) (P-2-M) (P-3-M) (A-5-M)
48. Illustrate patterns of change in dimension(s) and corresponding changes in volumes of rectangular solids (P-3-M)