

Mathematics Grade 9

Expectation	<i>Module/PLT activity</i>
Number and Number Relations	
1. Identify and describe differences among natural numbers, whole numbers, integers, rational numbers, and irrational numbers (N-1-H) (N-2-H) (N-3-H)	
2. Evaluate and write numerical expressions involving integer exponents (N-2-H)	<i>Focus on Risk, Communicating Risks</i>
3. Apply scientific notation to perform computations, solve problems, and write representations of numbers (N-2-H)	
4. Distinguish between an exact and an approximate answer, and recognize errors introduced by the use of approximate numbers with technology (N-3-H) (N-4-H) (N-7-H)	<i>Focus on Risk, Risk Assessment: Tools of the Trade</i> <i>Focus on Risk, Communicating Risks</i> <i>Focus on Risk, Weighing the Options</i> <i>Municipal Solid Waste, The Waste Stream</i> <i>Municipal Solid Waste, Recycling and Economics</i>
5. Demonstrate computational fluency with all rational numbers (e.g., estimation, mental math, technology, paper/pencil) (N-5-H)	<i>Focus on Risk, Chances Are...</i> <i>Focus on Risk, Risk Assessment: Tools of the Trade</i> <i>Focus on Risk, Communicating Risks</i> <i>Focus on Risk, Weighing the Options</i> <i>Focus on Risk, Decision Making</i> <i>Municipal Solid Waste, The Waste Stream</i> <i>Municipal Solid Waste, Recycling and Economics</i> <i>Municipal Solid Waste, Success Stories and Personal Choices</i> <i>Places We Live, Green Space</i> <i>Forests of the World, Analyzing Patterns of Forest Change</i> <i>Forest Ecology, Cast of Thousands</i>
6. Simplify and perform basic operations on numerical expressions involving radicals (e.g., $2\sqrt{3} + 5\sqrt{3} = 7\sqrt{3}$) (N-5-H)	
7. Use proportional reasoning to model and solve real-life problems involving direct and inverse variation (N-6-H)	<i>Focus on Risk, Risk Assessment: Tools of the Trade</i> <i>Focus on Risk, Communicating Risks</i> <i>Municipal Solid Waste, Recycling and Economics</i> <i>Municipal Solid Waste, Where Does Your Garbage Go?</i> <i>Forests of the World, Making Consumer Choices</i> <i>Forests of the World, Making Global Connections</i>
Algebra	
8. Use order of operations to simplify or rewrite variable expressions (A-1-H) (A-2-H)	
9. Model real-life situations using linear expressions, equations, and inequalities (A-1-H) (D-2-H) (P-5-H)	<i>Municipal Solid Waste, The Waste Stream</i> <i>Municipal Solid Waste, Recycling and Economics</i> <i>Municipal Solid Waste, Success Stories and Personal Choices</i> <i>Forests of the World, Making Consumer Choices</i> <i>Places We Live, Green Space</i> <i>Focus on Risk, Weighing Options</i> <i>Focus on Risk, Decision Making</i>
10. Identify independent and dependent variables in real-life relationships (A-1-H)	<i>Focus on Risk, Chances Are...</i> <i>Focus on Risk, Risk Assessment: Tools of the Trade</i> <i>Focus on Risk, Communicating Risks</i> <i>Focus on Risk, Weighing the Options</i> <i>Municipal Solid Waste, Recycling and Economics</i> <i>Municipal Solid Waste, Success Stories and Personal Choices</i> <i>Forests of the World, Making Consumer Choices</i> <i>Places We Live, Green Space</i>

11. Use equivalent forms of equations and inequalities to solve real-life problems (A-1-H)	
12. Evaluate polynomial expressions for given values of the variable (A-2-H)	
13. Translate between the characteristics defining a line (i.e., slope, intercepts, points) and both its equation and graph (A-2-H) (G-3-H)	
14. Graph and interpret linear inequalities in one or two variables and systems of linear inequalities (A-2-H) (A-4-H)	
15. Translate among tabular, graphical, and algebraic representations of functions and real-life situations (A-3-H) (P-1-H) (P-2-H)	<i>Focus on Forests, Who Owns America's Forests? Municipal Solid Waste, Recycling and Economics Municipal Solid Waste, Where Does Your Garbage Go? Forests of the World, Making Global Connections Focus on Risk, Risk Assessment: Tools of the Trade Focus on Risk, Decision Making</i>
16. Interpret and solve systems of linear equations using graphing, substitution, elimination, with and without technology, and matrices using technology (A-4-H)	
Measurement	
17. Distinguish between precision and accuracy (M-1-H)	<i>Forest Ecology, Cast of Thousands Municipal Solid Waste, The Waste Stream Forests of the World, Making Global Connections</i>
18. Demonstrate and explain how the scale of a measuring instrument determines the precision of that instrument (M-1-H)	
19. Use significant digits in computational problems (M-1-H) (N-2-H)	
20. Demonstrate and explain how relative measurement error is compounded when determining absolute error (M-1-H) (M-2-H) (M-3-H)	
21. Determine appropriate units and scales to use when solving measurement problems (M-2-H) (M-3-H) (M-1-H)	<i>Forest Ecology, Adopt a Forest Forest Ecology, Casts of Thousands Forest Ecology, Story of Succession Municipal Solid Waste, The Waste Stream Municipal Solid Waste, Composting Municipal Solid Waste, Success Stories and Personal Choices Forests of the World, Analyzing Patterns of Forest Change</i>
22. Solve problems using indirect measurement (M-4-H)	<i>Focus on Risk, Risk Assessment: Tools of the Trade Focus on Risk, Weighing Options Municipal Solid Waste, The Waste Stream Places We Live, Green Spaces</i>
Geometry	
23. Use coordinate methods to solve and interpret problems (e.g., slope as rate of change, intercept as initial value, intersection as common solution, midpoint as equidistant) (G-2-H) (G-3-H)	
24. Graph a line when the slope and a point or when two points are known (G-3-H)	
25. Explain slope as a representation of "rate of change" (G-3-H) (A-1-H)	
26. Perform translations and line reflections on the coordinate plane (G-3-H)	

Data Analysis, Probability, and Discrete Math

27. Determine the most appropriate measure of central tendency for a set of data based on its distribution (D-1-H)	
28. Identify trends in data and support conclusions by using distribution characteristics such as patterns, clusters, and outliers (D-1-H) (D-6-H) (D-7-H)	<i>Focus on Risk, Chances Are...</i> <i>Focus on Risk, Risk Assessment: Tools of the Trade</i> <i>Focus on Risk, Communicating Risks</i>
29. Create a scatter plot from a set of data and determine if the relationship is linear or nonlinear (D-1-H) (D-6-H) (D-7-H)	
30. Use simulations to estimate probabilities (D-3-H) (D-5-H)	<i>Focus on Risk, Chances Are...</i> <i>Focus on Risk, Risk Assessment: Tools of the Trade</i> <i>Focus on Risk, Communicating Risks</i>
31. Define probability in terms of sample spaces, outcomes, and events (D-4-H)	<i>Focus on Risk, Chances Are...</i> <i>Focus on Risk, Risk Assessment: Tools of the Trade</i> <i>Focus on Risk, Communicating Risks</i>
32. Compute probabilities using geometric models and basic counting techniques such as combinations and permutations (D-4-H)	<i>Focus on Risk, Chances Are...</i> <i>Focus on Risk, Risk Assessment: Tools of the Trade</i> <i>Focus on Risk, Communicating Risks</i>
33. Explain the relationship between the probability of an event occurring, and the odds of an event occurring and compute one given the other (D-4-H)	<i>Focus on Risk, What is Risk?</i> <i>Focus on Risk, Chances Are...</i> <i>Focus on Risk, Risk Assessment: Tools of the Trade</i> <i>Focus on Risk, Communicating Risks</i>
34. Follow and interpret processes expressed in flow charts (D-8-H)	<i>Focus on Risk, Risk Assessment: Tools of the Trade</i> <i>Municipal Solid Waste, The Waste Stream</i> <i>Municipal Solid Waste, Recycling and Economics</i>

Patterns, Relations, and Functions

35. Determine if a relation is a function and use appropriate function notation (P-1-H)	
36. Identify the domain and range of functions (P-1-H)	
37. Analyze real-life relationships that can be modeled by linear functions (P-1-H) (P-5-H)	<i>Focus on Risk, Risk Assessment: Tools of the Trade</i> <i>Municipal Solid Waste, The Waste Stream</i> <i>Forests of the World, Analyzing Patterns of Forest Change</i> <i>Forests of the World, Making Consumer Choices</i> <i>Forests of the World, Making Global Connections</i> <i>Focus on Forests, Who Owns America's Forests?</i>
38. Identify and describe the characteristics of families of linear functions, with and without technology (P-3-H)	
39. Compare and contrast linear functions algebraically in terms of their rates of change and intercepts (P-4-H)	
40. Explain how the graph of a linear function changes as the coefficients or constants are changed in the function's symbolic representation (P-4-H)	