

## Grade 8 → Grade 9 Math Progression Map

### OVERALL SHIFT

Grade 8	→	Grade 9
Build foundational understanding	→	Deepen and formalize concepts
Informal reasoning	→	More symbolic and abstract reasoning
Introduce algebra	→	Focus on <b>linear modeling as central theme</b>
Concrete + visual models	→	Increasing abstraction and efficiency

### Topic 1 : NUMBER (Rational Numbers → Advanced Operations & Exponents)

Grade 8 Content	Grade 9 Progression
Operations with integers	Refined use of rational number operations in multi-step problems
Fractions, decimals, percents	Applied in algebra and problem solving
Percent increase/decrease	Used in financial literacy and algebraic reasoning
Estimation and reasonableness	Continued emphasis in complex contexts

### Competency Progression for Number

Grade 8	Grade 9
Model with number lines, concrete tools	Apply flexibly in abstract problems and algebra

### Topic 2 : ALGEBRA (Emerging → Formalized)



**Major Shift :** Grade 9 centers on **linear relationships as a unifying idea**

### Expressions & Operations

Grade 8	Grade 9
Variables and simple expressions	Polynomials (add/subtract)
Evaluate expressions	Simplify and manipulate expressions
Translate words ↔ expressions	Analyze structure of expressions

### Equations

Grade 8	Grade 9
One-step equations	Multi-step equations
Conceptual understanding (balance model)	Formal symbolic solving
Simple verification	Systematic checking

**Patterns → Linear Relations (KEY TRANSITION)**

Grade 8	Grade 9
Identify and extend patterns	Model linear relations formally
Tables, graphs (intro)	Slope, intercepts, equations
Informal rules	Explicit equations ( $y = mx + b$ form)
Predict using patterns	Analyze rate of change

**Topic 3 : GEOMETRY & MEASUREMENT****Measurement**

Grade 8	Grade 9
Area, volume, surface area	Surface area & volume of composite figures
Apply formulas	Decompose complex objects
Estimate measurements	Increased precision and efficiency

**Transformations & Spatial Reasoning**

Grade 8	Grade 9
Transformations (translations, rotations, reflections)	Scale diagrams & proportional reasoning
Symmetry	Similar figures (informal)
Visual/spatial reasoning	Analytical spatial reasoning

**Competency Progression for Shape & Spatial Reasoning**

Grade 8	Grade 9
Movement of figures and visual understanding	Scaling and proportional relationships

**Topic 4 : DATA & PROBABILITY****Statistics**

Grade 8	Grade 9
Mean, median, mode	Same concepts but applied more critically
Basic graphs and tables (tally, bar, circle)	More emphasis on interpretation and critique
Represent data using specific models	Choose best representations independently

**Probability**

Grade 8	Grade 9
Basic probability concepts	Independent events
Simple experiments	Compare experimental vs theoretical
Express probabilities	More formal reasoning

## Topic 5 : FINANCIAL LITERACY

Grade 8	→	Grade 9
Percent applications	→	Simple interest
Basic budgeting ideas	→	More structured budgeting decisions
Real-life contexts	→	Deeper analysis of financial choices



### CURRICULAR COMPETENCY PROGRESSION

Competency	Grade 8	Grade 9
Reasoning	Use patterns and concrete reasoning	Analyze relationships and justify formally
Problem Solving	Use strategies with guidance	Select and apply strategies independently
Communication	Explain thinking with models	Use precise mathematical language
Representation	Multiple representations (intro)	Connect algebraic, graphical, numerical forms
Connecting	Math to everyday situations	Cross-strand and real-world modeling
Reflecting	Describe strategies	Evaluate and refine approaches



### BIG IDEAS PROGRESSION

Grade 8 Big Ideas	Grade 9 Development
Numbers represent quantities and relationships	Number operations support algebraic reasoning
Patterns describe relationships	<b>Linear relationships model real-world change</b>
Geometry describes space and measurement	Spatial reasoning includes scaling and proportionality
Data informs decisions	Critical analysis of data and probability



### KEY TRANSITION POINTS (Teacher Focus)

<b>1. Arithmetic → Algebra</b> <ul style="list-style-type: none"><li>• Ensure fluency with integers and rational numbers in Grade 8</li><li>• Critical for success with equations in Grade 9</li></ul>	<b>2. Patterning → Linear Functions</b> <ul style="list-style-type: none"><li>• Grade 8 pattern rules → Grade 9 equations</li><li>• Emphasize:<ul style="list-style-type: none"><li>○ Rate of change</li><li>○ Connections between representations</li></ul></li></ul>
<b>3. Concrete → Abstract Thinking</b> <ul style="list-style-type: none"><li>• Gradually reduce reliance on manipulatives</li><li>• Increase symbolic reasoning</li></ul>	<b>4. Multi-representation Mastery</b> <p>Students should transition from:</p> <ul style="list-style-type: none"><li>• “I can draw it” → “I can represent and analyze it algebraically”</li></ul>



### INSTRUCTIONAL IMPLICATIONS and RECOMMENDATIONS

- Plan to Return (Spiral):
  - Revisit Grade 8 skills early in Grade 9
- Emphasize Interconnectedness:
  - Graphing + equations together (not separate)
- Choose Authentic and Relevant Contexts:
  - Real-world modeling tasks
- Prioritize Buildable Skills:
  - Strong algebra foundation early in Grade 9