

# Math Mastery Scale

Skill	Descriptor
<p>Excelling <b>E</b></p>	<p>I know (can do) it well enough to make connections that weren't taught, and I'm right about those connections.</p>
<p>Thriving <b>P+</b></p>	<p>I know (can do) it well enough to make connections that weren't taught, but I'm not always right about those connections.</p>
<p>Proficient <b>P</b></p>	<p>I know (can do) everything that was taught (the easy parts and the harder parts) without making mistakes.</p>
<p>Gaining Stride <b>S+</b></p>	<p>I know (can do) all the easy parts and some (but not all) of the harder parts.</p>
<p>Satisfactory <b>S</b></p>	<p>I know (can do) all the easy parts, but I don't know (can't do) the harder parts yet.</p>
<p>Developing <b>B+</b></p>	<p>I know (can do) some of the easier parts, but I make some mistakes.</p>
<p>Basic <b>B</b></p>	<p>With help I know (can do) some of the harder parts and some of the easier parts.</p>
<p>emerging <b>e</b></p>	<p>With help, I know (can do) some of the easier parts but not the harder parts.</p>
<p>Limited <b>L</b></p>	<p>I don't know (can't do) any of it.</p>

**Strand: Number**

**General Outcome:** Develop number sense.

**9N1. Powers** - Demonstrate an understanding of power with integral bases (excluding base 0) and whole number exponents by;

- I can identify the parts of a power (base, exponent, brackets) and their roles.
- I can write a repeated multiplication number sentence as a power.
- I can write a power as a repeated multiplication.
- I can evaluate a power with a positive or negative base.
- I can show that a base with an exponent of zero is equal to one.
- I can solve problems involving powers.

**9N1 – Powers**

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**Reflections**

My goal is:		
Date	Specific Things I Will Do To Improve:	Teacher Initial

**Strand: Number**

**General Outcome:** Develop number sense.

**9N2. Exponent Laws** - Demonstrate an understanding of operations on powers with integral bases (excluding base 0) and whole number exponents:

- $(a^m)(a^n) = a^{m+n}$
- $a^m \div a^n = a^{m-n}, m > n$
- $(a^m)^n = a^{mn}$
- $(ab)^m = a^m b^m$
- $\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}, b \neq 0$

- I can prove why exponent laws work using examples.
- I can simplify expressions using the exponent laws.
- I can evaluate expressions using exponent laws.

**9N2 - Exponents**

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**Strand: Number**

**General Outcome:** Develop number sense.

**9N3. Rational Numbers - Demonstrate an understanding of rational numbers by:**

- I can define the term rational number.
- I can write rational numbers using equivalent numerical representations.
- I can order a set of rational numbers.
- I can identify a rational number between two given rational numbers.
- I can compare rational numbers using mathematical language (<, >, and =).
- I can solve problems using arithmetic operations on rational numbers.

**9N3 – Rational Numbers**

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**Strand: Number**

**General Outcome:** Develop number sense.

**9N4. Order of Operations** - Explain and apply the order of operations, including exponents, with and without technology.

- I can explain order of operations.
- I can apply order of operations.

**9N4 – Order of Operations**

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**Strand: Number**

**General Outcome:** Develop number sense.

**9N5. Square Roots of Perfect Squares** - Determine the square root of positive rational numbers that are perfect squares.

- I can determine if a rational number is a perfect square.
- I can identify the square root of a rational number that is a perfect square.

**9N5 – Square Roots of Perfect Squares**

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**Strand: Number**

**General Outcome:** Develop number sense.

**9N6. Approximating Square Roots** - Determine an approximate square root of positive rational numbers that are non-perfect squares.

- I can estimate the square root of a rational number.
- I can use technology to determine the square root of a rational number.

**9N6 – Approximating Square Roots**

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**Strand: Patterns & Relations**

**General Outcome:** Use patterns to describe the world and to solve problems.

**9PR1. Patterns and Equations** – Generalize a pattern arising from a problem-solving context, using a linear equation, and verify by substitution.

- I can represent a pattern with a linear equation.
- I can substitute into an expression or equation to verify a solution.

**9PR1 – Patterns and Equations**

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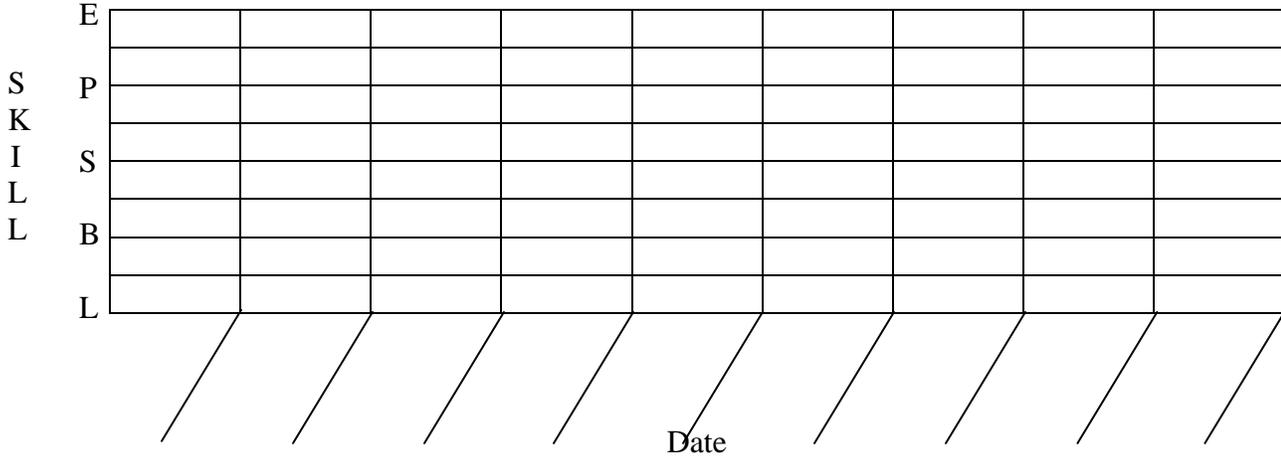
**Strand: Patterns & Relations**

**General Outcome:** Use patterns to describe the world and to solve problems.

**9PR2. Graphing Linear Relations** – Graph a linear relation, analyze the graph, and interpolate or extrapolate to solve problems.

- I can graph a linear relation.
- I can use a graph to solve problems.

**9PR2 – Graphing Linear Relations**



**Reflections**

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**Strand: Patterns & Relations**

**General Outcome:** Represent algebraic expressions in multiple ways.

**9PR3. Solving Equations** – Model and solve problems, using linear equations of the form:

- I can represent a given problem with an algebraic equation.
- I can solve the following types of equations:
  - $ax = b$
  - $\frac{x}{a} = b, a \neq 0$
  - $ax + b = c$
  - $\frac{x}{a} + b = c, a \neq 0$
  - $ax = b + cx$
  - $a(x + b) = c$
  - $ax + b = cx + d$
  - $a(bx + c) = d(ex + f)$
  - $\frac{a}{x} = b, x \neq 0$

Where  $a, b, c, d, e,$  and  $f$  are rational numbers.

- I can verify the solution to an algebraic equation.

**9PR3 – Solving Equations**

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**Strand: Patterns & Relations**

**General Outcome:** Represent algebraic expressions in multiple ways.

**9PR4. Inequalities** - Explain and illustrate strategies to solve single variable linear inequalities with rational coefficients within a problem-solving context.

- I can represent a given problem with an inequality.
- I can solve inequalities.
- I can verify the solution to an inequality.

**9PR4 – Inequalities**

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**Strand: Patterns & Relations**

**General Outcome:** Represent algebraic expressions in multiple ways.

**9PR5. Polynomials** – Demonstrate an understanding of polynomials (limited to polynomials of degree less than or equal to two.)

- I can recognize when an expression is (or is not) a polynomial.
- I can classify a polynomial according to the number of terms (monomial, binomial, trinomial, or polynomial).
- I can determine the degree of a polynomial.
- I can identify the coefficient(s), variable(s), and constant in a polynomial.

**9PR5 – Polynomials**

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**Strand: Patterns & Relations**

**General Outcome:** Represent algebraic expressions in multiple ways.

**9PR6. Adding & Subtracting Polynomials** – Model, record, and explain the operations of addition and subtraction of polynomial expressions, concretely, pictorially, and symbolically (limited to polynomials of degree less than or equal to two.)

- I can model addition of polynomials concretely, pictorially, and symbolically.
- I can model subtraction of polynomials concretely, pictorially, and symbolically.
- I can identify like terms.
- I can simplify polynomials by collecting like terms.
- I can add and subtract polynomials.

**9PR6 – Adding & Subtracting Polynomials**

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**Strand: Patterns & Relations**

**General Outcome:** Represent algebraic expressions in multiple ways.

**9PR7. Multiplying & Dividing Polynomials by Monomials** – Model, record, and explain the operations of multiplication and division of polynomial expressions (limited to polynomials of degree less than or equal to two) by monomials, concretely, pictorially, and symbolically.

- I can model multiplication of monomials by polynomials concretely, pictorially, and symbolically.
- I can model division of polynomials by monomials concretely, pictorially, and symbolically.
- I can multiply a polynomial by a monomial.
- I can divide a polynomial by a monomial.

**9PR7 – Multiplying & Dividing Polynomials by Monomials**

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**Strand: Shape and Space**

**General Outcome:** Use direct and indirect measurement to solve problems.

**9SS1. Circle Properties** – Solve problems and justify the solution strategy, using the following circle properties:

- The perpendicular from the centre of a circle to a chord bisects the chord.
  - The measure of the central angle is equal to twice the measure of the inscribed angle subtended by the same arc.
  - The inscribed angles subtended by the same arc are congruent.
  - A tangent to a circle is perpendicular to the radius at the point of tangency.
- I can solve problems using properties of chords in circles.
- I can solve problems using properties of angles in circles.
- I can solve problems using the tangent of a circle.

**9SS1 – Circle Properties**

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**Strand: Shape and Space**

**General Outcome:** Use direct and indirect measurement to solve problems.

**9SS2. Surface Area** – Determine the surface area of composite 3-D objects to solve problems (limited to right rectangular prisms, right triangular prisms, and right cylinders).

- I can identify the faces of a composite 3-D object.
- I can dissect the faces of 3-D objects into triangles, circles, and rectangles (or parts of these shapes).
- I can determine the dimensions needed to calculate the surface area of composite 3-D objects.
- I can calculate the surface area of composite 3-D objects.
- I can solve problems involving surface area.

**9SS2 – Surface Area**

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**Strand: Shape and Space**

**General Outcome:** Use direct and indirect measurement to solve.

**9SS3. Similarity** – Demonstrate an understanding of similarity of polygons.

- I can determine if two polygons are similar and justify my solution.
- I can draw a polygon that is similar to another.
- I can solve problems involving similar polygons.

**9SS3 - Similarity**

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**Strand: Shape and Space**

**General Outcome:** Use direct and indirect measurement to solve.

**9SS4. Scale Diagrams** – Draw and interpret scale diagrams of 2-D shapes.

- I can draw a diagram to scale.
- I can determine the scale factor for a given diagram.
- I can solve problems involving scale.

**9SS4 – Scale Diagrams**

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**Strand: Shape and Space**

**General Outcome:** Describe the characteristics of 3-D objects and 2-D shapes, and analyze the relationships among them.

**9SS5. Symmetry** – Demonstrate an understanding of line and rotation symmetry.

- I can determine if a shape has line symmetry.
- I can determine is a shape has rotation symmetry.
- I can describe line symmetry using appropriate mathematical vocabulary.
- I can describe rotation symmetry using appropriate mathematical vocabulary
- I can create shapes that demonstrate line and/or rotation symmetry.

**9SS5 - Symmetry**

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**Strand: Statistics & Probability**

**General Outcome:** Collect, display and analyze data to solve problems.

**9SP1. Data Collection** – Describe the effect of each of the following on the collection of data.

- bias
  - use of language
  - ethics
  - cost
  - time and timing
  - privacy
  - cultural sensitivity
- I can describe the effect of various factors on data collection using examples and appropriate mathematical vocabulary.

**9SP1 – Data Collection**

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**Strand: Statistics & Probability**

**General Outcome:** Use experimental or theoretical probabilities to represent and solve problems involving uncertainty.

**9SP2. Samples** – Select and defend the choice of using either a population or a sample of a population to answer a question.

- I can determine when using a population or a sample is more appropriate and defend the choice.

**9SP2 - Samples**

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**Strand: Statistics & Probability**

**General Outcome:** Use experimental or theoretical probabilities to represent and solve problems involving uncertainty.

**9SP3. Data Collection, Display, and Analysis** – Develop and implement a project plan for the collection, display, and analysis of data by:

- I can formulate a question for investigation.
- I can choose a data collection method that includes social considerations.
- I can select a population or a sample.
- I can collect data.
- I can display collected data in an appropriate manner.
- I can draw conclusions to answer questions.

**9SP3 – Data Collection, Display, and Analysis**

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**Strand: Statistics & Probability**

**General Outcome:** Use experimental or theoretical probabilities to represent and solve problems involving uncertainty.

**9SP4. Probability** – Demonstrate an understanding of the role of probability in society.

- I can identify situations where probability is used in society.
- I can explain how decisions are made using theoretical and experimental probabilities.

**9SP4 – Probability**

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