

Grade Six Outcomes	Grade Seven Outcomes	Grade Eight Outcomes
<p>Number (N)</p> <ol style="list-style-type: none"> Demonstrate an understanding of place value for numbers: greater than one million; less than one thousandth. Solve problems involving large numbers, using technology. Demonstrate an understanding of factors and multiples by: determining multiples and factors of numbers less than 100; identifying prime and composite numbers; solving problems involving multiples. Relate improper fractions to mixed numbers. Demonstrate an understanding of ratio, concretely, pictorially and symbolically. Demonstrate an understanding of percent, (limited to whole numbers) concretely, pictorially and symbolically. Demonstrate an understanding of integers, concretely, pictorially and symbolically. Demonstrate an understanding of multiplication and division of decimals (1-digit whole number multipliers and 1-digit natural number divisors). Explain and apply the order of operations, excluding exponents, with and without technology (limited to whole numbers). 	<p>Number (N)</p> <ol style="list-style-type: none"> Determine and apply the divisibility rules for 2, 3, 4, 5, 6, 8, 9 or 10, and explain why a number cannot be divided by 0. Demonstrate an understanding of the addition, subtraction, multiplication and division of decimals (for more than 1-digit divisors or 2-digit multipliers, the use of technology is expected) to solve problems. Solve problems involving percents from 1% to 100%. Demonstrate an understanding of the relationship between positive repeating decimals and positive fractions, and positive terminating decimals and positive fractions. Demonstrate an understanding of adding and subtracting positive fractions and mixed numbers, with like and unlike denominators, concretely, pictorially and symbolically (limited to positive sums and differences). Demonstrate an understanding of addition and subtraction of integers, concretely, pictorially and symbolically. Compare and order positive fractions, positive decimals (to thousandths) and whole numbers by using: benchmarks; place value; equivalent fractions and/or decimals. 	<p>Number (N)</p> <ol style="list-style-type: none"> Demonstrate an understanding of perfect squares and square roots, concretely, pictorially and symbolically (limited to whole numbers). Determine the approximate square root of numbers that are not perfect squares (limited to whole numbers). Demonstrate an understanding of percents greater than or equal to 0%. Demonstrate an understanding of ratio and rate. Solve problems that involve rates, ratios and proportional reasoning. Demonstrate an understanding of multiplying and dividing positive fractions and mixed numbers, concretely, pictorially and symbolically. Demonstrate an understanding of multiplication and division of integers, concretely, pictorially and symbolically.
<p>Patterns & Relations (PR) (Patterns)</p> <ol style="list-style-type: none"> Demonstrate an understanding of the relationship within tables of values to solve problems. Represent and describe patterns and relationships using graphs and tables. <p>(Variables and Equations)</p> <ol style="list-style-type: none"> Represent generalizations arising from number relationships using equations with letter variables. Demonstrate and explain the meaning of preservation of equality concretely, pictorially and symbolically. 	<p>Patterns & Relations (PR) (Patterns)</p> <ol style="list-style-type: none"> Demonstrate an understanding of oral and written patterns and their equivalent linear relations. Create a table of values from a linear relation, graph the table of values, and analyze the graph to draw conclusions and solve problems. <p>(Variables and Equations)</p> <ol style="list-style-type: none"> Demonstrate an understanding of preservation of equality by: modelling preservation of equality, concretely, pictorially and symbolically; applying preservation of equality to solve equations. Explain the difference between an expression and an equation. Evaluate an expression given the value of the variable(s). Model and solve problems that can be represented by one-step linear equations of the form $x + a = b$, concretely, pictorially and symbolically, where a and b are integers. Model and solve problems that can be represented by linear equations of the form: $ax = b$; $ax + b = c$; $\frac{x}{a} = b$, $a \neq 0$ concretely, pictorially and symbolically, using whole numbers. 	<p>Patterns & Relations (PR) (Patterns)</p> <ol style="list-style-type: none"> Graph and analyze two variable linear relations. <p>(Variables and Equations)</p> <ol style="list-style-type: none"> Model and solve problems using linear equations of the form: $ax = b$; $\frac{x}{a} = b$, $a \neq 0$; $ax + b = c$; $\frac{x}{a} + b = c$, $a \neq 0$; $a(x + b) = c$ concretely, pictorially and symbolically, where a, b and c are integers.
<p>Shape and Space (SS) (Measurement)</p> <ol style="list-style-type: none"> Demonstrate an understanding of angles by: identifying examples of angles in the environment; classifying angles according to their measure; estimating the measure of angles using 45°, 90° and 180° as reference angles; determining angle measures in degrees; drawing and labeling angles when the measure is specified. Demonstrate that the sum of interior angles is: 180° in a triangle; 360° in a quadrilateral. Develop and apply a formula for determining the: perimeter of polygons; area of rectangles; volume of right rectangular prisms. <p>(3-D Objects and 2-D Shapes)</p> <ol style="list-style-type: none"> Construct and compare triangles, including: scalene; isosceles; equilateral; right; obtuse; and acute in different orientations. Describe and compare the sides and angles of regular and irregular polygons. <p>(Transformations)</p> <ol style="list-style-type: none"> Perform a combination of translation(s), rotation(s) and/or reflection(s) on a single 2-D shape, with and without technology, and draw and describe the image. Perform a combination of successive transformations of 2-D shapes to create a design, and identify and describe the transformations. Identify and plot points in the first quadrant of a Cartesian plane using whole number ordered pairs. Perform and describe single transformations of a 2-D shape in the first quadrant of a Cartesian plane (limited to whole number vertices). 	<p>Shape and Space (SS) (Measurement)</p> <ol style="list-style-type: none"> Demonstrate an understanding of circles by: describing the relationships among radius, diameter and circumference of circles; relating circumference to pi; determining the sum of the central angles; constructing circles with a given radius or diameter; solving problems involving the radii, diameters and circumferences of circles. Develop and apply a formula for determining the area of: triangles; parallelograms; circles. <p>(3-D Objects and 2-D Shapes)</p> <ol style="list-style-type: none"> Perform geometric constructions, including: perpendicular line segments; parallel line segments; perpendicular bisectors; angle bisectors. <p>(Transformations)</p> <ol style="list-style-type: none"> Identify and plot points in the four quadrants of a Cartesian plane using integral ordered pairs. Perform and describe transformations (translations, rotations or reflections) of a 2-D shape in all four quadrants of a Cartesian plane (limited to integral number vertices). 	<p>Shape and Space (SS) (Measurement)</p> <ol style="list-style-type: none"> Develop and apply the Pythagorean theorem to solve problems. Draw and construct nets for 3-D objects. Determine the surface area of: right rectangular prisms; right triangular prisms; right cylinders to solve problems. Develop and apply formulas for determining the volume of right prisms and right cylinders. <p>(3-D Objects and 2-D Shapes)</p> <ol style="list-style-type: none"> Draw and interpret top, front and side views of 3-D objects composed of right rectangular prisms. <p>(Transformations)</p> <ol style="list-style-type: none"> Demonstrate an understanding of tessellation by: explaining the properties of shapes that make tessellating possible; creating tessellations; identifying tessellations in the environment.
<p>Statistics and Probability (SP) (Data Analysis)</p> <ol style="list-style-type: none"> Create, label and interpret line graphs to draw conclusions. Select, justify and use appropriate methods of collecting data, including: questionnaires; experiments; databases; electronic media. Graph collected data and analyze the graph to solve problems. <p>(Chance and Uncertainty)</p> <ol style="list-style-type: none"> Demonstrate an understanding of probability by: identifying all possible outcomes of a probability experiment; differentiating between experimental and theoretical probability; determining the theoretical probability of outcomes in a probability experiment; determining the experimental probability of outcomes in a probability experiment; comparing experimental results with the theoretical probability for an experiment. 	<p>Statistics and Probability (SP) (Data Analysis)</p> <ol style="list-style-type: none"> Demonstrate an understanding of central tendency and range by: determining the measures of central tendency (mean, median, mode) and range; determining the most appropriate measures of central tendency to report findings. Determine the effect on the mean, median & mode when an outlier is included in the data. Construct, label and interpret circle graphs to solve problems. <p>(Chance and Uncertainty)</p> <ol style="list-style-type: none"> Express probabilities as ratios, fractions and percents. Identify the sample space (where the combined sample space has 36 or fewer elements) for a probability experiment involving two independent events. Conduct a probability experiment to compare the theoretical probability (determined using a tree diagram, table or another graphic organizer) and experimental probability of two independent events. 	<p>Statistics and Probability (SP) (Data Analysis)</p> <ol style="list-style-type: none"> Critique ways in which data is presented. <p>(Chance and Uncertainty)</p> <ol style="list-style-type: none"> Solve problems involving the probability of independent events.

**“LOOK FORs” in an Effective Mathematics Program
Grade 6 – Grade 8**

STUDENT ACTIVITIES

Actively engaged in meaningful and quality learning experiences that build on what they know and can do.

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| <p>Students: (S)</p> <ol style="list-style-type: none"> 1. Have a positive attitude towards math 2. Can articulate the learning outcome being explored 3. Communicate their ideas and understanding using oral language, concrete materials and/or drawings 4. Ask questions and share ideas with the teacher and other students 5. Are appropriately involved in some aspect of the task and are engaged 6. Make connections with math and their experiences 7. Seek assistance when needed | <ol style="list-style-type: none"> 8. Use a variety of models, manipulatives and technology appropriately 9. Work in groups, pairs, or independently (opportunity for each of these) 10. Use a variety of problem solving strategies: <ul style="list-style-type: none"> - act it out - use a model - draw a picture - guess and check - use a pattern 11. Accept that there are a variety of solution methods: not just one that is “correct” |
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TEACHER ACTIVITIES

Observe, record and assess individual and group progress and base instruction on this information as well as curriculum outcomes.

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| <p>Teacher:</p> <p align="center"><u>Instructional Practices (IP)</u></p> <ol style="list-style-type: none"> 1. Uses a variety of types of lessons that include a balance of student-centred and teacher-directed <ul style="list-style-type: none"> o Shared: working with others o Guided: teacher as facilitator o Independent: by themselves 2. Exhibits a progression of lesson parts <ul style="list-style-type: none"> o Before: warm up, explore ideas o During: deepen understanding o After: share and reflect 3. Focuses instruction on the meaningful development of key mathematical concepts 4. Presents concepts beginning with <u>concrete</u> models (i.e. manipulatives) and then moves toward <u>pictorial</u> and <u>symbolic</u> at an appropriate rate for all to make sense of the math 5. Ensures the balance between developing of conceptual understanding and learning mathematical procedures and “rules” 6. Uses a variety of resources for the delivery of the lesson 7. Uses open-ended questions and problems <ul style="list-style-type: none"> o often more than one method of solving and more than one solution with many entry points 8. Incorporates mental math regularly in lessons 9. Connects lessons to previous learning, real world experiences and other subjects 10. Uses differentiated instruction to meet the needs of all students 11. Looks for opportunities to extend learning beyond math classroom environment 12. Provides appropriate “wait time” for all students to think and respond 13. Reviews previously taught concepts regularly | <ol style="list-style-type: none"> 14. Focuses on problem solving and communication skills and models this for students 15. Ensures that practice is relevant and appropriate in type and quantity <p align="center"><u>Curriculum Management (CM)</u></p> <ol style="list-style-type: none"> 1. Uses curriculum document: to ensure key skills and knowledge for that grade are being taught 2. Identifies outcome(s) being addressed and teaches these in groups as appropriate 3. Uses a variety of resources to plan, such as: curriculum, core and other resources, technology 4. Ensures instruction is developmentally appropriate: focuses on understanding concepts 5. Makes note of misconceptions and problems students may encounter with concept 6. Writes a clear lesson plan daily and a yearly plan is evident and is adjusted as needed 7. Maximizes use of instructional time <p align="center"><u>Assessment (A)</u></p> <ol style="list-style-type: none"> 1. Uses formative assessment and self-reflection to inform instruction 2. Uses a variety of approaches, including rubrics, conferencing and interviews, observations, journals, self-assessment (“What did I learn?”) 3. Assesses conceptual understanding and skills 4. Circulates throughout the lesson to assist and assess students 5. Ensures homework is meaningful and appropriate 6. Establishes method for recording student performance information 7. Accommodates students’ abilities & learning styles 8. Communicates student progress regularly to parents and students |
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**“LOOK FORs” in an Effective Mathematics Program
Grade 6 – Grade 8**

GUIDELINES

The following pages describe what one should observe in classrooms that promote student learning of mathematical concepts and skills.

- These “Look Fors” are organized in three categories:
- **Classroom Environment:** that includes... physical organization, mathematical models, and student involvement
 - **Student Activities:** that includes... a variety of learning experiences that promote problem solving, reasoning, making connections, and communication
 - **Teacher Activities:** that includes... a variety of instructional approaches and assessment strategies used regularly

The purpose of these “Look Fors” is to provide a framework for teachers and schools as a common model for mathematics instruction and to assist administrators in providing specific and valuable feedback to teachers to help implement best practices in mathematics classrooms. The following guidelines are not intended to limit individual teacher’s creativity or to suggest that all mathematics classes should be identical; they are meant to assist teachers in the teaching of math.

CLASSROOM ENVIRONMENT

The teacher created classroom environment has a profound effect on the social, emotional, physical and intellectual development of students.

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| <p align="center"><u>Social/Emotional (SE)</u>
<u>inclusive, engaging, supportive</u></p> <ol style="list-style-type: none"> 1. Teacher demonstrates that they believe all students can learn math 2. Teacher models a positive attitude and enthusiasm towards math 3. Teacher values and builds upon students’ prior knowledge and makes math relevant to students’ experiences 4. Teacher creates a classroom community that values all contributors; there is an acceptance of alternative approaches and solutions 5. Teacher provides students with choices in support of differentiation: content, process, product 6. Teacher supports students to explore ideas, ask questions, and take risks 7. Teacher shares and displays students’ work and demonstrates a variety of representations 8. Teacher communicates the purpose and value of what students are learning | <p align="center"><u>Physical (P)</u>
<u>interactive, intentional, managed</u></p> <ol style="list-style-type: none"> 1. Teacher arranges furniture so students can interact effectively (partner/small group work) 2. Teacher arranges students in groups that are of an appropriate size and variety to encourage participation by all students 3. Teacher posts curriculum outcome currently being taught 4. Teacher displays words, symbols, calendars, charts, and other math related materials around the room 5. Teacher locates math materials (blocks, cubes, shapes, learning carpets, etc.) in the room for easy access by students 6. Teacher establishes routines for distributing and collecting materials 7. Teacher uses models (manipulatives, etc.) as thinking/learning tools for all students 8. Teacher uses exploratory centres (such as extension activities) to support and further students’ understanding of math 9. Teacher uses technology appropriately to support instruction (calculators, computers, projected displays, SMART Boards) |
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