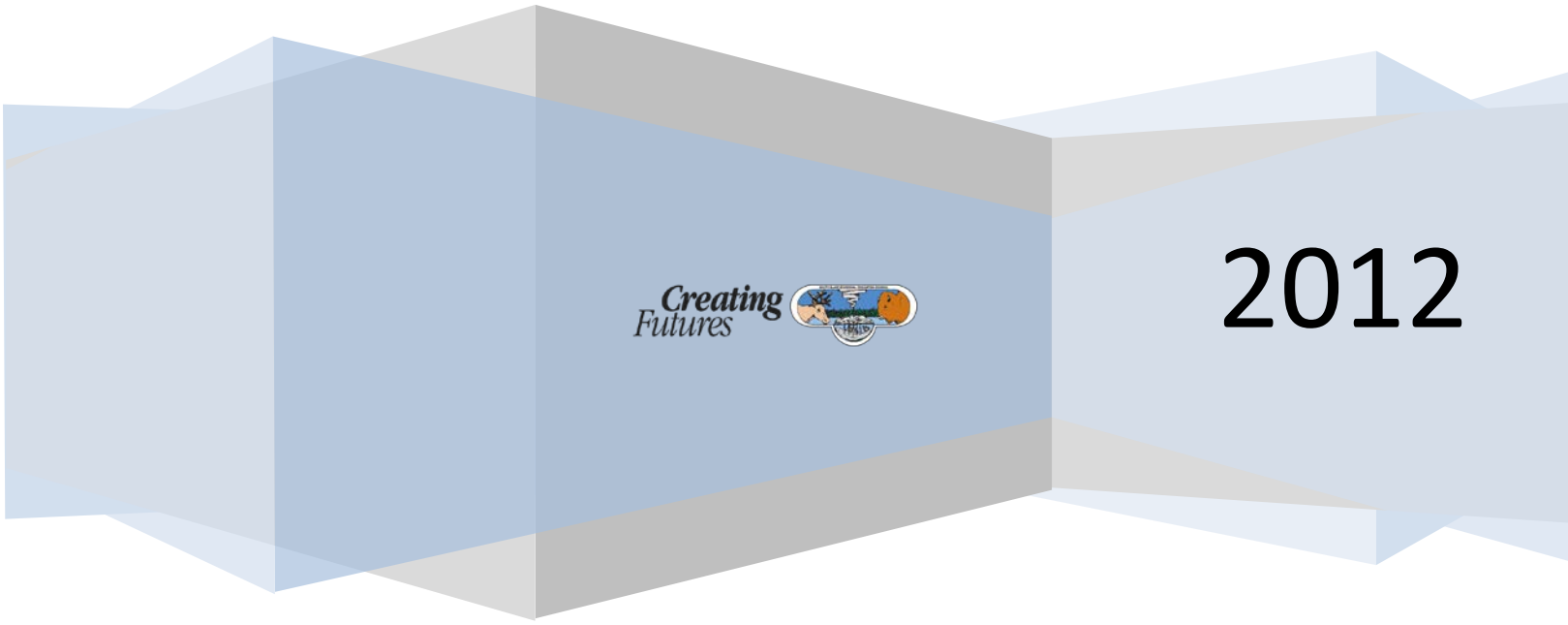
South Slave Divisional Education Council

Math 10-3

Curriculum Package

February 2012



Strand: Measurement

General Outcome: Develop spatial sense through direct and indirect measurement.

Specific Outcomes	Achievement Indicators – Measurable outcomes
It is expected that students will:	*The following set of indicators may be used to assess student achievement for each related specific learning outcome. Students who have fully met the specific learning outcomes are able to:*
Demonstrate an understanding of the Système International (SI) by: • describing the relationships of the units for length, area, volume, capacity, mass and temperature • applying strategies to convert SI units to imperial units.[C, CN, ME, V]	• Explain how the SI system was developed, and explain its relationship to base ten. • Identify the base units of measurement in the SI system, and determine the relationship among the related units of each type of measurement. • Identify contexts that involve the SI system. • Match the prefixes used for SI units of measurement with the powers of ten. • Explain, using examples, how and why decimals are used in the SI system. • Provide an approximate measurement in SI units for a measurement given in imperial units; e.g., 1 inch is approximately 2.5 cm. • Write a given linear measurement expressed in one SI unit in another SI unit. • Convert a given measurement from SI to imperial units by using proportional reasoning (including formulas); e.g., Celsius to Fahrenheit, centimetres to inches.
Demonstrate an understanding of the imperial system by: • describing the relationships of the units for length, area, volume, capacity, mass and temperature • comparing the American and British imperial units for capacity • applying strategies to convert imperial units to SI units. [C, CN, ME, V]	• Explain how the imperial system was developed. • Identify commonly used units in the imperial system, and determine the relationships among the related units. • Identify contexts that involve the imperial system. • Explain, using examples, how and why fractions are used in the imperial system. • Compare the American and British imperial measurement systems; e.g., gallons, bushels, tons. • Provide an approximate measure in imperial units for a measurement given in SI units; e.g., 1 litre is approximately $\frac{1}{4}$ US gallon. • Write a given linear measurement expressed in one imperial unit in another imperial unit. • Convert a given measure from imperial to SI units by using proportional reasoning (including formulas); e.g., Fahrenheit to Celsius, inches to centimetres.
Solve and verify problems that involve SI and imperial linear measurements, including decimal and fractional measurements. [CN, ME, PS, V]	• Identify a referent for a given common SI or imperial unit of linear measurement. • Estimate a linear measurement, using a referent. • Measure inside diameters, outside diameters, lengths, widths of various given objects, and distances, using various measuring instruments. • Estimate the dimensions of a given regular 3-D object or 2-D shape, using a referent; e.g., the height of the desk is about three rulers long, so the desk is approximately three feet high. • Solve a linear measurement problem including perimeter, circumference, and length + width + height (used in shipping and air travel). • Determine the operation that should be used to solve a linear measurement problem. • Provide an example of a situation in which a fractional linear measurement would be divided by a fraction. • Determine, using a variety of strategies, the midpoint of a linear measurement such as length, width, height, depth, diagonal and diameter of a 3-D object, and explain the strategies. • Determine if a solution to a problem that involves linear measurement is reasonable.

Strand: Measurement

General Outcome: Develop spatial sense through direct and indirect measurement.

Specific Outcomes	Achievement Indicators – Measurable outcomes
It is expected that students will:	*The following set of indicators may be used to assess student achievement for each related specific learning outcome. Students who have fully met the specific learning outcomes are able to:*
Solve problems that involve SI and imperial area measurements of regular, composite and irregular 2-D shapes and 3-D objects, including decimal and fractional measurements, and verify the solutions. [ME, PS, R, V]	• Identify and compare referents for area measurements in SI and imperial units. • Estimate an area measurement, using a referent. • Identify a situation where a given SI or imperial area unit would be used. • Estimate the area of a given regular, composite or irregular 2-D shape, using an SI square grid and an imperial square grid. • Solve a contextual problem that involves the area of a regular, a composite or an irregular 2-D shape. • Write a given area measurement expressed in one SI unit squared in another SI unit squared. • Write a given area measurement expressed in one imperial unit squared in another imperial unit squared. • Solve a problem, using formulas for determining the areas of regular, composite and irregular 2-D shapes, including circles. • Solve a problem that involves determining the surface area of 3-D objects, including right cylinders and cones. • Explain, using examples, the effect of changing the measurement of one or more dimensions on area and perimeter of rectangles. • Determine if a solution to a problem that involves an area measurement is reasonable.
Strand: Geometry General Outcome: Develop spatial sense.	
Analyze puzzles and games that involve spatial reasoning, using problem-solving strategies.[C, CN, PS, R]	• Determine, explain and verify a strategy to solve a puzzle or to win a game; e.g., guess and check o Look for a pattern o Make a systematic list o Draw or model o Eliminate possibilities o Simplify the original problem o Work backward o Develop alternative approaches. • Identify and correct errors in a solution to a puzzle or in a strategy for winning a game. • Create a variation on a puzzle or a game, and describe a strategy for solving the puzzle or winning the game.
Demonstrate an understanding of the Pythagorean theorem by: • identifying situations that involve right triangles • verifying the formula • applying the formula • solving problems.[C, CN, PS, V]	• Explain, using illustrations, why the Pythagorean theorem only applies to right triangles. • Verify the Pythagorean theorem, using examples and counterexamples, including drawings, concrete materials and technology. • Describe historical and contemporary applications of the Pythagorean theorem. • Determine if a given triangle is a right triangle, using the Pythagorean theorem. • Explain why a triangle with the side length ratio of 3:4:5 is a right triangle. • Explain how the ratio of 3:4:5 can be used to determine if a corner of a given 3-D object is square (90º) or if a given parallelogram is a rectangle. • Solve a problem, using the Pythagorean theorem.

Strand: Geometry

General Outcome: Develop spatial sense.

Specific Outcomes	Achievement Indicators – Measurable outcomes
It is expected that students will:	*The following set of indicators may be used to assess student achievement for each related specific learning outcome. Students who have fully met the specific learning outcomes are able to:*
Demonstrate an understanding of similarity of convex polygons, including regular and irregular polygons. [C, CN, PS, V]	• Determine, using angle measurements, if two or more regular or irregular polygons are similar. • Determine, using ratios of side lengths, if two or more regular or irregular polygons are similar. • Explain why two given polygons are not similar. • Explain the relationships between the corresponding sides of two polygons that have corresponding angles of equal measure. • Draw a polygon that is similar to a given polygon. • Explain why two or more right triangles with a shared acute angle are similar. • Solve a contextual problem that involves similarity of polygons.
Demonstrate an understanding of primary trigonometric ratios (sine, cosine, tangent) by: • applying similarity to right triangles • generalizing patterns from similar right triangles • applying the primary trigonometric ratios • solving problems.[CN, PS, R, T, V] [ICT: C6–4.1]	• Show, for a specified acute angle in a set of similar right triangles, that the ratios of the length of the side opposite to the length of the side adjacent are equal, and generalize a formula for the tangent ratio. • Show, for a specified acute angle in a set of similar right triangles, that the ratios of the length of the side opposite to the length of the hypotenuse are equal, and generalize a formula for the sine ratio. • Show, for a specified acute angle in a set of similar right triangles, that the ratios of the length of the side adjacent to the length of the hypotenuse are equal, and generalize a formula for the cosine ratio. • Identify situations where the trigonometric ratios are used for indirect measurement of angles and lengths. • Solve a contextual problem that involves right triangles, using the primary trigonometric ratios. • Determine if a solution to a problem that involves primary trigonometric ratios is reasonable.
Solve problems that involve parallel, perpendicular and transversal lines, and pairs of angles formed between them. [C, CN, PS, V]	• Sort a set of lines as perpendicular, parallel or neither, and justify this sorting. • Illustrate and describe complementary and supplementary angles. • Identify, in a set of angles, adjacent angles that are not complementary or supplementary. • Identify and name pairs of angles formed by parallel lines and a transversal, including corresponding angles, vertically opposite angles, alternate interior angles, alternate exterior angles, interior angles on same side of transversal and exterior angles on same side of transversal. • Explain and illustrate the relationships of angles formed by parallel lines and a transversal. • Explain, using examples, why the angle relationships do not apply when the lines are not parallel. • Determine if lines or planes are perpendicular or parallel, e.g., wall perpendicular to floor, and describe the strategy used. • Determine the measures of angles involving parallel lines and a transversal, using angle relationships. • Solve a contextual problem that involves angles formed by parallel lines and a transversal (including perpendicular transversals).

Strand: Geometry

General Outcome: Develop spatial sense.

Specific Outcomes	Achievement Indicators – Measurable outcomes
It is expected that students will:	*The following set of indicators may be used to assess student achievement for each related specific learning outcome. Students who have fully met the specific learning outcomes are able to:*
Demonstrate an understanding of angles, including acute, right, obtuse, straight and reflex, by: • drawing • replicating and constructing • bisecting • solving problems. [C, ME, PS, T, V] [ICT: C6–4.1]	• Draw and describe angles with various measures, including acute, right, straight, obtuse and reflex angles. • Identify referents for angles. • Sketch a given angle. • Estimate the measure of a given angle, using 22.5°, 30°, 45°, 60°, 90° and 180° as referent angles. • Measure, using a protractor, angles in various orientations. • Explain and illustrate how angles can be replicated in a variety of ways; e.g., Mira, protractor, compass and straightedge, carpenter's square, dynamic geometry software. • Replicate angles in a variety of ways, with and without technology. • Bisect an angle, using a variety of methods. • Solve a contextual problem that involves angles.

Strand: Number

General Outcome: Develop number sense and critical thinking skills.

Solve problems that involve unit pricing and currency exchange, using proportional reasoning. [CN, ME, PS, R] [ICT: F2–4.7]	• Compare the unit price of two or more given items. • Solve problems that involve determining the best buy, and explain the choice in terms of the cost as well as other factors, such as quality and quantity. • Compare, using examples, different sales promotion techniques; e.g., deli meat at $2 per 100 g seems less expensive than $20 per kilogram. • Determine the percent increase or decrease for a given original and new price. • Solve, using proportional reasoning, a contextual problem that involves currency exchange. • Explain the difference between the selling rate and purchasing rate for currency exchange. • Explain how to estimate the cost of items in Canadian currency while in a foreign country, and explain why this may be important. • Convert between Canadian currency and foreign currencies, using formulas, charts or tables.
Demonstrate an understanding of income, including: • wages • salary • contracts • commissions • piecework to calculate gross pay and net pay.[C, CN, R, T] [ICT: C6–4.1, C6–4.2, C7–4.2, F2–4.7]	• Describe, using examples, various methods of earning income. • Identify and list jobs that commonly use different methods of earning income; e.g., hourly wage, wage and tips, salary, commission, contract, bonus, shift premiums. • Determine in decimal form, from a time schedule, the total time worked in hours and minutes, including time and a half and/or double time. • Determine gross pay from given or calculated hours worked when given: o the base hourly wage, with and o without tips o the base hourly wage, plus overtime (time and a half, double time). • Determine gross pay for earnings acquired by: o base wage, plus commission o single commission rate. • Explain why gross pay and net pay are not the same. • Determine the Canadian Pension Plan (CPP), Employment Insurance (EI) and income tax deductions for a given gross pay.

Strand: Number

General Outcome: Develop number sense and critical thinking skills

Specific Outcomes	Achievement Indicators – Measurable outcomes
It is expected that students will:	*The following set of indicators may be used to assess student achievement for each related specific learning outcome. Students who have fully met the specific learning outcomes are able to:*
Continued	• Determine net pay when given deductions; e.g., health plans, uniforms, union dues, charitable donations, payroll tax. • Investigate, with technology, "what if …" questions related to changes in income; e.g., "What if there is a change in the rate of pay?" • Identify and correct errors in a solution to a problem that involves gross or net pay. • Describe the advantages and disadvantages for a given method of earning income; e.g., hourly wage, tips, piecework, salary, commission, contract work.
Strand: Algebra **General Outcome:** Develop algebraic reasoning.	
Solve problems that require the manipulation and application of formulas related to: • perimeter • area • the Pythagorean theorem • primary trigonometric ratios • income. [C, CN, ME, PS, R]	• Solve a contextual problem that involves the application of a formula that does not require manipulation. • Solve a contextual problem that involves the application of a formula that requires manipulation. • Explain and verify why different forms of the same formula are equivalent. • Describe, using examples, how a given formula is used in a trade or an occupation. • Create and solve a contextual problem that involves a formula. • Identify and correct errors in a solution to a problem that involves a formula.