

Math 20-3
Curriculum Package
February 2012



2012

Strand: Measurement

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

Specific Outcomes	Achievement Indicators – Measurable outcomes
<i>It is expected that students will:</i>	<i>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:</i>
Solve problems that involve SI and imperial units in surface area measurements and verify the solutions. [C, CN, ME, PS, V]	<ul style="list-style-type: none"> • Explain, using examples, the difference between volume and surface area. • Explain, using examples, including nets, the relationship between area and surface area. • Explain how a referent can be used to estimate surface area. • Estimate the surface area of a 3-D object. • Illustrate, using examples, the effect of dimensional changes on surface area. • Solve a contextual problem that involves the surface area of 3-D objects, including spheres, and that requires the manipulation of formulas.
Solve problems that involve SI and imperial units in volume and capacity measurements. [C, CN, ME, PS, V]	<ul style="list-style-type: none"> • Explain, using examples, the difference between volume and capacity. • Identify and compare referents for volume and capacity measurements in SI and imperial units. • Estimate the volume or capacity of a 3-D object or container, using a referent. • Identify a situation where a given SI or imperial volume unit would be used. • Solve problems that involve the volume of 3-D objects and composite 3-D objects in a variety of contexts. • Solve a problem that involves the capacity of containers. • Write a given volume measurement expressed in one SI unit cubed in another SI unit cubed. • Write a given volume measurement expressed in one imperial unit cubed in another imperial unit cubed. • Determine the volume of prisms, cones, cylinders, pyramids, spheres and composite 3-D objects, using a variety of measuring tools such as rulers, tape measures, calipers and micrometers. • Determine the capacity of prisms, cones, pyramids, spheres and cylinders, using a variety of measuring tools and methods, such as graduated cylinders, measuring cups, measuring spoons and displacement. • Describe the relationship between the volumes of: cones and cylinders with the same base and height pyramids and prisms with the same base and height. • Illustrate, using examples, the effect of dimensional changes on volume. • Solve a contextual problem that involves the volume of a 3-D object, including composite 3-D objects, or the capacity of a container. • Solve a contextual problem that involves the volume of a 3-D object and requires the manipulation of formulas.

Strand: Geometry

General Outcome: Develop spatial sense.

Solve problems that involve two and three right triangles.[CN, PS, T, V]	<ul style="list-style-type: none"> • Identify all of the right triangles in a given illustration for a context. • Determine if a solution to a problem that involves two or three right triangles is reasonable. • Sketch a representation of a given description of a problem in a 2-D or 3-D context. • Solve a contextual problem that involves angles of elevation or angles of depression. • Solve a contextual problem that involves two or three right triangles, using the primary trigonometric ratios
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Strand: Geometry

General Outcome: Develop spatial sense.

Specific Outcomes	Achievement Indicators – Measurable outcomes
<i>It is expected that students will:</i>	<i>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:</i>
Solve problems that involve scale. [PS, R, V]	<ul style="list-style-type: none"> • Determine, using proportional reasoning, the dimensions of an object from a given scale drawing or model • Construct a model of a 3-D object, given the scale • Draw, with and without technology, a scale diagram of a given object • Solve a contextual problem that involves scale
Model and draw 3-D objects and their views. [CN, R, V]	<ul style="list-style-type: none"> • Draw, using isometric dot paper, a given 3-D object. • Draw to scale top, front and side views of a given 3-D object. • Construct a model of a 3-D object, given the top, front and side views. • Draw a 3-D object, given the top, front and side views. • Determine if given views of a 3-D object represent a given object, and explain the reasoning. • Identify the point of perspective of a given one-point perspective drawing of a 3-D object. • Draw a one-point perspective view of a given 3-D object.
Draw and describe exploded views, component parts and scale diagrams of simple 3-D objects. (It is intended that the simple 3-D objects come from contexts such as flat-packed furniture or sewing patterns.)	<ul style="list-style-type: none"> • Draw the components of a given exploded diagram, and explain their relationship to the original 3-D object. • Sketch an exploded view of a 3-D object to represent the components. • Draw to scale the components of a 3-D object. • Sketch a 2-D representation of a 3-D object, given its exploded view.
Strand: Number	
General Outcome: Develop number sense and critical thinking skills.	
Analyze puzzles and games that involve numerical reasoning, using problem-solving strategies.[C, CN, PS, R] <i>(It is intended that this outcome be integrated throughout the course by using puzzles and games such as cribbage, magic squares and Kakuro.)</i>	<ul style="list-style-type: none"> • Determine, explain and verify a strategy to solve a puzzle or to win a game; e.g., <ul style="list-style-type: none"> ○ guess and check ○ look for a pattern ○ make a systematic list ○ draw or model ○ eliminate possibilities ○ simplify the original problem ○ work backward • 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.
Solve problems that involve personal budgets.[CN, PS, R, T]	<ul style="list-style-type: none"> • Identify income and expenses that should be included in a personal budget. • Explain considerations that must be made when developing a budget; e.g., prioritizing, recurring and unexpected expenses. • Create a personal budget based on given income and expense data. • Collect income and expense data, and create a budget. • Modify a budget to achieve a set of personal goals. • Investigate and analyze, with or without technology, “what if ...” questions related to personal budgets.

Strand: Number

General Outcome: Develop number sense and critical thinking skills.

Specific Outcomes	Achievement Indicators – Measurable outcomes
<i>It is expected that students will:</i>	<i>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:</i>
Demonstrate an understanding of compound interest.[CN, ME, PS, T] [ICT: C6–4.1]	<ul style="list-style-type: none"> • Solve a problem that involves simple interest, given three of the four values in the formula $I=Prt$. • Compare simple and compound interest, and explain their relationship. • Solve, using a formula, a contextual problem that involves compound interest. • Explain, using examples, the effect of different compounding periods on calculations of compound interest. • Estimate, using the Rule of 72, the time required for a given investment to double in value.
Demonstrate an understanding of financial institution services used to access and manage finances.[C, CN, R, T]	<ul style="list-style-type: none"> • Describe the type of banking services available from various financial institutions, such as online services. • Describe the types of accounts available at various financial institutions. • Identify the type of account that best meets the needs for a given set of criteria. • Identify and explain various automated teller machine (ATM) service charges. • Describe the advantages and disadvantages of online banking. • Describe the advantages and disadvantages of debit card purchases. • Describe ways that ensure the security of personal and financial information; e.g., passwords, encryption, protection of personal identification number (PIN) and other personal identity information.
Demonstrate an understanding of credit options, including: <ul style="list-style-type: none"> • credit cards • loans.[CN, ME, PS, R] 	<ul style="list-style-type: none"> • Compare advantages and disadvantages of different types of credit options, including bank and store credit cards, personal loans, lines of credit, overdraft. • Make informed decisions and plans related to the use of credit, such as service charges, interest, payday loans and sales promotions, and explain the reasoning. • Describe strategies to use credit effectively, such as negotiating interest rates, planning payment timelines, reducing accumulated debt and timing purchases. • Compare credit card options from various companies and financial institutions. • Solve a contextual problem that involves credit cards or loans. • Solve a contextual problem that involves credit linked to sales promotions.

Strand: Algebra

General Outcome: Develop algebraic reasoning.

Solve problems that require the manipulation and application of formulas related to: <ul style="list-style-type: none"> • volume and capacity • surface area • slope and rate of change • simple interest • finance charges. [CN, PS, R] 	<ul style="list-style-type: none"> • Solve a contextual problem involving the application of a formula that does not require manipulation. • Solve a contextual problem involving 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.
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Strand: Algebra

General Outcome: Develop algebraic reasoning.

Specific Outcomes	Achievement Indicators – Measurable outcomes
<i>It is expected that students will:</i>	<i>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:</i>
Demonstrate an understanding of slope: <ul style="list-style-type: none"> • as rise over run • as rate of change • by solving problems. [C, CN, PS, V] 	<ul style="list-style-type: none"> • Describe contexts that involve slope; e.g., ramps, roofs, road grade, flow rates within a tube, skateboard parks, ski hills. • Explain, using diagrams, the difference between two given slopes (e.g., a 3:1 and a 1:3 roof pitch), and describe the implications. • Describe the conditions under which a slope will be either 0 or undefined. • Explain, using examples and illustrations, slope as rise over run. • Verify that the slope of an object, such as a ramp or a roof, is constant. • Explain, using illustrations, the relationship between slope and angle of elevation; e.g., for a ramp with a slope of 7:100, the angle of elevation is approximately 4°. • Explain the implications, such as safety and functionality, of different slopes in a given context. • Explain, using examples and illustrations, slope as rate of change. • Solve a contextual problem that involves slope or rate of change
Solve problems by applying proportional reasoning and unit analysis.[C, CN, PS, R]	<ul style="list-style-type: none"> • Explain the process of unit analysis used to solve a problem (e.g., given km/h and time in hours, determine how many km; given revolutions per minute, determine the number of seconds per revolution). • Solve a problem, using unit analysis. • Explain, using an example, how unit analysis and proportional reasoning are related; e.g., to change km/h to km/min, multiply by 1h/60min because hours and minutes are proportional (constant relationship). • Solve a problem within and between systems, using proportions or tables; e.g., km to m or km/h to ft/sec.

Strand: Statistics

General Outcome: Develop statistical reasoning.

Solve problems that involve creating and interpreting graphs, including: <ul style="list-style-type: none"> • bar graphs • histograms • line graphs • circle graphs. [C, CN, PS, R, T, V] [ICT: C6–4.1, C6–4.2, C6–4.3, P2–4.1]	<ul style="list-style-type: none"> • Determine the possible graphs that can be used to represent a given data set, and explain the advantages and disadvantages of each. • Create, with and without technology, a graph to represent a given data set. • Describe the trends in the graph of a given data set. • Interpolate and extrapolate values from a given graph. • Explain, using examples, how the same graph can be used to justify more than one conclusion. • Explain, using examples, how different graphic representations of the same data set can be used to emphasize a point of view. • Solve a contextual problem that involves the interpretation of a graph.
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