Prework Math: Curriculum Guide with Resources

A 2015-16 PDIG was used to allow a small group of Prework teachers and a consultant from WQSB the opportunity to examine the course content for Prework Math.

The aim of this project was to closely examine the suggested Prework curriculum and its pedagogical direction. This direction states that math concepts and skills need to be aligned with competencies at home, the workplace, and in life outside of school.
With this goal in mind, we developed a suggested guide for each year of Prework. We examined the curriculum outcomes for Prework Mathematics and broke each year down into a recommended number of weeks.

The concepts from the curriculum were placed into groupings for Year 1, 2 and 3 based on the time allocation for Math
(Year 1= 150 hrs , Year 2= 100 hrs and Year 3=50 hrs). Within each year, the concepts were then broken down to provide a guideline for teaching. This was designed to alleviate repetition for students and establish a foundation to build upon; similar to the general academic pathway. Next, we linked each concept to a real world application to make them more relevant to our students. The ultimate goal being to teach the students in a manner that is practical to them as individuals outside of the program. Finally, we went through a selection of resources and attempted to link the concepts to application problems and situational problems from WQSB math resources to create a bank for teachers to use and refer to.

The workbooks that are referenced in the Resources section are merely suggestions. They have been created for an Ontario Math course which has similar learning targets to Prework. It is a Locally Developed Compulsory Credit Course designed for students who not only "*require flexibility and support*" but do not have" *the necessary preparation for a secondary program*".
http://www.edugains.ca/resources/CurriculumDocuments/LDCC_Math_9_10.pdf

The Math Essentials workbooks (ME9 and ME10), and Mathematics: Workplace and Everyday Life 12 (WP12) are available for purchase through the McGraw-Hill Ryerson website; and the Mathematics: Concepts and Connections (CC) is available for purchase through the Nelson website. There are many math resources available however that can and should be used but we found that sections of these books were closely related to our learning objectives.

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Excerpts from the Prework Math Curriculum

http://www.learnquebec.ca/export/sites/learn/en/content/curriculum/wotp/documents/WOTP_PWT/Subject_Area_Resources/PWT_Mathematics.pdf

Teachers must take each student's particular needs into account when choosing learning content. The idea is not to restrict the range of the different branches of mathematics, but rather to focus on selected elements of the discipline in accordance with each student's level of learning and, in some cases, job requirements or the possibility of going on to a program in a semiskilled trade.

Teachers should also focus on concrete objects, make direct connections with practical applications and have students regularly apply their learning to other subjects in order to impress upon them the usefulness of mathematics. Finally, they must help students realize the extent to which they need mathematics in their everyday lives.

By the end of the program, students will have exercised their mathematical competencies at home, in the workplace or in their recreational activities. For example, they will need to have learned to solve transportation problems involving space, distance, time, cost, etc.

 During practicums, they will have applied and consolidated competencies that should enable them to hold a job. For example, a student who has learned to calculate correctly should be able to make change as a service station attendant, while a student who has developed spatial perception should be able to figure out how to display items in a store working as an assistant clerk.

In their recreational activities, students will be encouraged to base their decisions on a cost analysis, taking into account their budget, the availability of services (e.g. location, distance) and potential health advantages (e.g. body mass, heart rate).

In addition to these practical concerns, teachers should also help students as much as possible to develop logic, abstraction skills and the ability to use appropriate mathematical language when needed.

Prework Math: Curriculum Guide with Resources

Prework Year 1 (36 weeks)	Real world applications/ Learning objectives	Resources

Number Sense
  a. fractions
  b. decimals
  c. rounding/place value
  d. ratio and rates
  e. scaling
  f. percents
  g. integers
 	
(8 weeks)
	Writing Cheques
	  - Place Value
	  - Written Notation of numbers
	  - Converting between written notation and standard form
	Reading a thermometer
	Calculate Tax, tip, discount
	  - Percent
	  - Decimals
	  - Converting
	  - Rounding to nearest hundredth
	Estimating Costs/Rounding Costs
	  - Rounding to nearest Dollar, Quarter, Nickel
	  - Decimals
	  - Counting Money
	  - Equivalent Values (ex. 4 quarter is 1 dollar)
	  - Adding and Subtracting Money
	  - Calculating/Making Change
		Ch 6: Dining Out (ME9)
		A little pocket money -Application
		Mr. Big Bucks - Situational
		How Cold is it? Application
		
		Prime Time -Situational
		
		Used Clothing Sale - fraction of a whole- Application
		A Trip Around the World - Application
		
		Pizza Party -Application
		
		Grocery Cart - Application

Time Management
  a. telling time on a 24H clock
  b. reading a clock
  c. units of time; seconds, minutes, hours, days, months, years….
  d. calculating time; converting minutes to hours and vice versa
  e. Time zones
(6 weeks)
	Time - Analogue vs Digital Clocks
	  - 12H and 24H clock
	  - Converting (seconds, minutes, hours, days, weeks, years, decade, century)
	  - Elapsed time
	  - Work hours
	  - Time zones
	  - Distance/Speed/Time calculations
	  - Application: Traveling, watching sports
		Ch 10: The World of Work (ME9)
		A Knight's Day (Answer)- Application
		Sleeping Like an Elephant - Application

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Prework Year 1	Real world applications/ Learning objectives	Resources

Data Management
  a. organizing data
  b. recognizing an increasing and decreasing patterns
  c. interpreting a linear graph
 	
(4 weeks)
	Data Management
	- Measures of central tendency (mean, median, mode)
	- A look at when mean fails to represent the group
	- Recognizing increasing and decreasing patterns
	- Value of your house over time vs value of your car over time
	- Understanding Bar Graphs, Broken line graphs, circle graphs
		Ch 1: Understanding Data (CC)
		Application Questions
		Exploring Mysterious Caves
		Rain Rain Go Away
		The cost of Raising Kids
		Stairway to Heaven
		Fundraising Activities
		More Milk Please
		Flying through the clouds
		One Sequel After Another
		The Cost of Clothing
		Not Your Average Knight
		Awarding Medals

Measurement
  a. units of measurement; distance, area, volume
  b. comparing units; a yard is similar to a meter.
  c. estimating
  d. rounding
  e. reading a measuring tape
 	
(6 weeks)
	Units of Measurements
	- Understanding the different units of measurement Imperial vs Metric
	- Using a ruler and a measuring tape
	- Scale
	- Equivalent ratios
	- Estimating measurement
	- using personal reference: thumb is an inch, pinky is 1 cm
	- appropriate units of measurement
		Ch 2: Linear Measurement: Metric (ME9)
		Ch3: Linear Measurement: Imperial (ME9)
		Ch 8: Healthy Choices (ME9)
		
		H2O - Application
		
		Farmer Tom (Answer) - Situational (Also covers Number Sense and Budget)

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Prework Year 1	Real world applications/ Learning objectives	Resources

Geometry
  a. 3D shapes; Cylinder, sphere
  b. Polygons; triangle, square,
      pentagon, hexagon, octagon
  c. nets of a solid
  d. finding area and surface area
  e. directions and angles
     (North, South, East, West)
 	
                 (6 weeks)
	Perimeter
	  - adding/subtracting fractions (Imperial measurement)
	  - Circles, rectangles and triangles
	  - simple compound shapes
	  - Naming 3-D shapes
	Area
	
	  - multiplying fractions and decimals
	  - circles, rectangles and triangles
	  - simple compound shapes, with/without cutouts
	  - Application: Building a 3D shape, drawing the scale net first and then constructing it and painting it.
		Ch 9: Boxed In (ME9)
		Ch 9 Circles and Cylinders (ME10)
		
		To Paint or Not to Paint - Application - Geometry/Area/Surface Area with Cutout
		My Olympic Village - Situational (Also covers Measurement scale drawings etc.)
		A Strange Reality - Application
		The Birdhouse - Application

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Prework Year 2 (24 weeks)	Real world applications/ Learning objectives	Resources

Review elapsed time
Salary, Rate of Pay, Piece work,
            commission
Understanding your pay stub
   a. C.P.P.
   b. E.I.
   c. Vacation Pay
   d. Union Dues
Taxes (PY3 extension)
   a. T4's
   b. filing a tax return   (6 weeks)
	Spending Making Money
	   - Ways you earn money :
	      - Overtime
	      - Commission
	      - Salary
	      - Piecewise/
	         piecework
		Ch 1: Working for our money (ME10)
		Ch 4: Filing a tax return (WP-Math12)
		
		A Little Pocket Money - Application
		
		Vet Visit - Application

Consumerism
   a. making change
   b. tips
   c. unit price (better buy)
   d. discounts
   e. taxes
   f. earning wages
 	
                                       (6 weeks)
	Discounts/Rebates/Tips
	   - Percents
	   - Rounding Decimals
	   - Fractions
	Spending Money/Making
	   - Adding and subtracting
	   - Better Buy/Calculating Unit Price
	   - Weekly Earning, Monthly Earnings, Yearly Earnings
		Ch 1: Money Matters (ME9)
		Ch 2: Spending Money (ME 10)
		Application Questions
		Talking Parrots
		Birthday Pizza
		Bargain Hunt
		Sweet Dreams
		Finding a Deal
		Sizing up the situation
		Fundraising Campaign
		Organic Products
		Used Clothing Sale

Proportionality
   a. understanding the use of ratios and
      rates
                                       (4 weeks)
	Application: L/100 km, distance, speed, time. Planning a delivery schedule delivering packages from one city to another…	Ch 5: Sports and Leisure (ME9)
		Ch 7: Getting the Right Mix (ME10)
		Ch 8: Planning a Trip (ME10)
		A question of timing - Application
		On Tour Across Canada - Situational

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Prework Year 2	Real world applications/ Learning objectives	Resources

Measurement
  a. area of square, rectangle and circle
  b. measuring and estimating measuring spoons
  c. unit conversions; metric to imperial
 	
(4 weeks)
	Units of Measurement
	- Ordering fractions on a measuring tape
	- Converting between metric units
	- Multiplying and Dividing by 10, 100, 1000 etc.
	- Converting between Metric and Imperial (especially Km and Miles, Pounds to Kg etc.)
	Triangles
	- angles (acute, obtuse and right)
	- Equilateral, Right, Isosceles, scalene
	- pythagoras theorem
	Cooking
	- Capacity (Cups, teaspoon, tablespoon)
	- Fractions
	- Scaling up or down a recipe
	- Cost of materials
	- Timing
	- Building a playhouse, painting a room, laying flooring, recipes
		Ch 4: Cooking (ME9)
		Ch 7: Home Improvement (ME9)
		Ch 3: Linear Measurement: Metric (ME10)
		Ch 4: Linear Measurement: Imperial (ME10)
		Ch 5: Properties of Circles (ME10)
		Ch 6: Circles and Angles (ME 10)
		Ch 10: Gardens, Patios, and Pools (ME10)
		Ch 2: Measuring our consumption (CC)
		Carpet Making - Application - Simple linear measurement question
		
		On the Run -Application - Rates/Distance/Converting units
		
		Equal Perimeters - Application - Perimeter and Area
		Boxes of Yearbooks - Application - Mass, unit conversion and rate
		Birthday Party -Application
		A Horse Corral - Application
		Patio Construction – Application

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Prework Year 3 (12 weeks)	Real world applications/ Learning objectives	Resources

Review elapsed time, salary rate of pay, piece work, commission….
 	
Understanding your pay stub (See PY2)
 	
Taxes
   c. T4's
   d. filing a tax return   (6 weeks)
	Pay stubs, rate of pay, time calculations
	
	Taxation
		Ch 1: Working for our money (ME10)
		Ch 4: Filing a tax return (WPMath12)
		CRA Teacher Resources -
		Taxes and T4s Free downloadable content
		Practical Money Skills - Resources and Payment calculators - Educator lesson plans can be ordered or downloaded and games

Statistics and Probability
   a. odds
   b. fractions
   c. ratios
   d. circle graphs (interpreting and creating)
 	
                (2 weeks)
	Probability
	   - Odds
	   - Chance
	   - Weather
	   - Fair games?
		Ch 1: Probability (WP-Math12)
		Ch 2: Budgets (WP-Math12)
		Application Questions
		The cost of raising kids
		Pet Hermit Crab
		Destination
		Roll The Dice
		What Are the Chances
		A Matter of Chance
		Armour Dilemma
		Combination Pizza

Financial Planning
   a. budgeting
   b. credit cards
   c. investing
   d. rent vs mortgage
 	
                (4 weeks)
	Budgeting
	   - Income vs. Expenses
	   - Positive and Negative Integers
	Paying Installments
	   - Loans (Comparing getting a loan vs. saving the money first)
	   - Rent vs Mortgage payments
	   - Payment term
		-Practical Money Skills - Resources and Payment calculators
		-Educator lesson plans can be ordered or downloaded and games
		- good lessons Renting vs Buying, Credit Cards, Cars and Loans

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Other Resources:

Excellent Free Workbook Style Resources

Simply Math
Home Math
Kitchen Math
Money Math

The Yearbook (Answer) - Situational exam which covers many topics including reading graphs, fractions, money
Our Very Own Water Dragon (Answer) - Situational exam - Money, Area, Fractions