Statewide Career Pathways Basic Skills Curriculum
Contextualized Math Module

Students will:

OUTCOMES/ STANDARDS	CONTENT	ACTIVITIES/RESOURCES	ASSESSMENT
1. Apply problem-solving skills and the Pythagorean Theorem in landscape design *IL STAN: 1.G.7, 2.G.1, 2.G.4, 3.G.1, 3.G.4, 3.R.FW.1, 3.W.PD.5, 3.R.FW.1,4.EE.1, 4.EE.10, 4.EE.14, 4.G.1, 4.G.5, 4.G.11, 4.W.RB.1, 4.W.RB.1, 4.R.FW.1*	Problem Solving, Geometry, Algebra	• Discuss mathematical concepts that would be necessary in a career of landscape architecture. • View the following video clip: "Landscape Architects," regarding the creation of Lurie Garden, Millennium Park, Chicago, IL. http://thefutureschannel.com/videogallery/landscape-architects/ • Complete worksheet "MATH 110 Landscape Horticulture" found in attachments and at: http://mathonline.southseattle.edu/math110/mat110land.html • Get career advice and educational pathway for landscape architects.	Student completion of Landscape Horticulture worksheet
2. Design, test, and evaluate results in an engineering role *IL STAN: 1.MD.1, 1.MD.4, 2.MD.1, 2.MD.11, 3.MD.1, 3.MD.9, 5.MD.1, 3.S.PK.4, 3.R.FW.4*	Distance measuring, speed calculation	• Discuss the role of engineers in the design of cars. http://thefutureschannel.com/jennifer-guthrie • Create cars with rubber bands and other common materials, which have the ability to travel three meters, measuring distance and calculating speed of travel. Instructions and student worksheets in Resources.	Instructor observation; student completion of experiment and worksheets
3. Perform the basic math operations with decimals, understanding how they relate to careers in law enforcement	Mathematical operations, decimals	• Gain a basic knowledge of law enforcement careers, including: Most police officers receive relatively low pay, and most police agencies are under-staffed. Police officers put their lives on the line to protect and serve the community. • Police officers measure drivers' speeds using radar or Vascar. The phrase "serving an execution" is also used in the student activity. This refers to a law enforcement officer going to a business or residence to	Student completion of "To Protect and Serve"

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IL STAN: 4.EE.1, 4.EE.10, 4.EE.14, 4.RP.3, 4.RP.6, 3.W.PD.5, 4.W.RB.1, 3.R.FW.1, 4.R.FW.1, 3.R.FW.4		collect on an unpaid bond. For example, if the bond is for $20,000 then the company may settle for a percentage of it. The officers can enter the home or business and collect property at that value, sell it at an auction, and give the money back to the bonding company. • In small groups, answer discussion questions (provided in Resources), then reconvene to discuss as a class. • Complete "To Protect and Serve" worksheet (Resources) • View the video clip: "Crime Fighting with Math" http://www.nbcbayarea.com/news/local/Crime_Fighting_Math_Bay_Area -108266114.html	
4. Alter catering recipes within food service industry *IL STAN: 4.RP.2, 4.RP.5, 3.S.PK.4, 3.R.FW.1*	Fractions, decimals, percentage	• Discuss the food service industry, using discussion questions (Resources). • In groups, complete recipe alterations for "Apple Pan Dowdy". (Resources) • Present solutions to the class. • Compare the different solutions.	Student completion of "A Catered Affair" and class presentation
5. Strategize to protect an endangered species as a wildlife biologist *IL STAN: 4.EE.1, 4.EE.10, 4.EE.14, 4.R.FW.1*	Problem solving, variables, multi-step problems	• Discuss how mathematical concepts could be used as a wildlife biologist. • Watch the video clip: "The Black-Footed Ferret." http://thefutureschannel.com/videogallery/the-blackfooted-ferret/ • Complete student activities "Ferret Figures" (Resources).	Student completion of "Ferret Figures"
6. Determine weather patterns in meteorology	Integers, graphs	• Read and discuss "Life as a Meteorologist" as whole class (Resources). • Complete study questions (Resources). • Create a spreadsheet and double line graph of the monthly highs and	Student completion of worksheet, spreadsheet/

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IL STAN: 1.MD.2, 1.MD.52.MD.2, 2.MD.12, 3.MD.2, 3.MD.5, 5.S.MD.2		lows of a European capital. ("European Weather "worksheet and directions found in Resources.)Have students play "Positive and Negative Integers: A Card Game" to provide practice for adding and subtracting negative integers. Resources	graph

7. Apply probability concepts in healthcare
 	
IL STAN: 4.SP.6, 4.SP.14, 4.SP.1, 4.SP.4, 4.SP.9, 4.SP.17, 3.R.FW.4
	Probability	• Explore the concept of probability, practicing with a number of rounds of coin toss.
		• Understand the following terms and definitions:
		Pediatrics
		
		The branch of medicine that deals with the medical care of infants, children, and adolescents (from newborn to age 18 or 19).
		
		Geriatrics
		
		The branch of medicine that focuses on health promotion and the prevention and treatment of disease and disability in later life. The term can be distinguished from gerontology, which is the study of the aging process itself. The term comes from the Greek "geros" meaning "old man" and "iatros" meaning "healer." In the USA, geriatricians are primary care physicians who are board-certified in either Family Practice or Internal Medicine and have also acquired the additional training necessary to obtain the Certificate of Added Qualifications (CAQ) in Geriatric Medicine.
		• Review independent events and discuss as a class the following:
		  1. Why do health professionals need to know the probabilities mentioned in this lesson?
		  2. How will this knowledge help them when dealing with patients? Talk about screening for risks and the probability of certain illnesses in reference to age, gender, ethnic group, genetic ties, etc.
		• Complete "Let's Review" worksheet as a class (Resources).
		• Individually complete "A Career in the Medical Field Might be Neat!" (Resources)
			Student completion of Let's Review and A Career in the Medical Field…

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8. Apply geometrical concepts to home repair and renovation *IL STAN: 1.G.7, 2.G.1, 2.G.4, 3.G.1, 3.G.4, 4.G.1, 4.G.5, 4.G.11, 3.W.PD.5, 3.W,RB.1, 4.W.RB.1*	Area, perimeter, cost calculation	• Calculate the perimeter and total square footage for the basement of mock floor plan (Resources). • Discuss the role of general contractors and that part of the job is giving estimates. • Working in small groups within two large teams, analyze the cost for their small job.(Job Sheets in Resources) • Use a trusted hardware store website to check on current local prices for all of the supplies mentioned on the student job sheets. • Small groups meet with their original teams to add the costs of all five jobs. Record the total on the team estimation work page. This number is the contractor's supply cost. Add labor cost and submit their estimates. • Each team explains supply cost, labor cost, and total estimate for the job. • Brainstorm as a class which careers were represented in the assignment and possible reasons why good math skills are crucial in these jobs.	Student completion of estimate and class presentation
9. Create and apply a survey *IL STAN: 4.SP.1, 4.SP.6, 4.SP.14, 4.R.FW.1, 3.W.RB.1, 4.W.RB.1*	Number and operations, Data analysis and probability	• Discuss the concept of frequency tables. • Brainstorm a list of jobs that might use frequency tables (market analysts, political analysts, sports statisticians, etc.) • Access the information about market researchers and read about that occupation. • Using the ice cream survey, survey the students on their favorite ice cream flavors (Resources). • Take on the role of marketing researchers at an ice cream company, using the survey data just collected to create a frequency table showing which ice cream flavors are most popular. The table will be used by the ice cream company to determine how much of each flavor to produce. • Work in pairs to create a poster with the frequency table and to design a presentation to deliver to the company.	Instructor observation, student completion of survey/ poster, class presentation

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10. Use hypothetical scenarios to explore the concept of linear equations *IL STAN: 4.EE.1, 4.EE.4, 4.EE.10, 4.E.14, 3.W.RB.1, 4.W.RB.1,3.S.PK.4, 4.R.FW.1*	Algebra, linear equations	• Using phone rate plans found at http://time.com/money/4359895/compare-best-cell-phone-plans/,calculate monthly bills and identify patterns within phone usage using the phone charts (Resources). • Determine mathematical formulas to use to calculate usage (found in Resources) • Discuss what jobs use these types of skills. (Answers include careers in advertising and marketing, construction managers, accountants and auditors, computer programmers, mathematicians, architects, aerospace engineers, and biomedical engineers. • Discuss how people in these careers might use linear equations.	Instructor observation, completion of Linear Equations Scenarios
11. Understand how to use nets (a two-dimensional version of a three-dimensional solid) to calculate the surface area of rectangular prisms *IL STAN: 1.G.4, 3,G.7, 4.G.4, 4.G.8, 4.G.14, 3.S.PK.4*	Rational numbers, Geometry	• Discuss the concept of surface area and how it is used in box manufacturing. • Brainstorm other careers in which people may use surface area in their lines of work. (Answers may include other packaging companies, cabinet makers, construction workers, landscapers, engineers, etc.) • In small groups, examine a three-dimensional box, determining what measurements must be known in order to calculate how much material is needed to make a given box. (height, width, and length.) • Discuss whether there would be an easier way to take the measurements (a flattened box). • Examine a flattened box, drawing a "net" representing the box pattern on their graph paper. (One square on the graph paper should equal one inch of the box.) Record the dimensions of each side of the box on the graph paper. • Calculate the area of each rectangular space and add each area together to find the total surface area. • Complete Cardboard Box Factory worksheet (Resources), using the information they learned in class. (15 minutes)	Instructor observation, student completion of Cardboard Box Factory worksheet

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12. Interpret and write verbal phrases and sentences as simple algebraic expressions and equations *IL STAN: 4.EE.1, 4.EE.10, 4.EE.14, 4.EE.2, 4.EE.11, 4.EE.15, 4.R.FW.1*	Numbers and Operations	• Discuss jobs that require determining surface area in three dimensions — not just one surface at a time. Examples may include postal workers loading multiple packages in a limited amount of space on a boat heading overseas and grocers stocking shelves with cereal boxes in a limited amount of shelf space. • Discuss *addition*, *subtraction*, *multiplication*, and *division* and that words and phrases often suggest math operations, which can help solve problems. Write natural language words that signify each operation. (For example, "is half as big as" signifies division.) • Use the "Writing Mathematical Expressions and Equations" worksheet to find examples of word sentences to translate into mathematical symbols. • Brainstorm different careers that may need to translate expressions/equations into mathematical terms in order to communicate with their fellow workers or the general public. Be sure that the following are included in the list: landscape artists, bill and account collectors, civil engineering tech, bank teller, crane operator, carpet installer, mechanic, bartender, computer repair tech and pharmacy techs, customer service rep. As careers are mentioned, discuss them and ask how they might need to translate from mathematical terms into natural language or vice-versa. Information about these and other careers can be found in the Bureau of Labor Statistics' *Occupational Outlook Handbook*. http://www.bls.gov/ooh/ • Based on an assigned career via Career Cards (in Resources), create at least four mathematical expressions/equations that might be used by people in the assigned career. Brainstorm some of the responsibilities of these careers. Examples include: For the career card "customer service	Student completion of Writing Mathematical Expressions and Equations, class presentation

OUTCOMES/ STANDARDS	CONTENT	ACTIVITIES/RESOURCES	ASSESSMENT
		rep," an expression that could be created by the students: "Quality of work is measured by number of calls completed in a work day ÷ quality rating from customers" This would be translated to "x + 1," where x represents the number of calls and 1 is the excellent quality rating from customers." • For the career card "landscape artist," an expression that could be created by the students: "The cost for the client served to have sod installed is length times wide time cost of sod (z) times plus labor cost (y)." This would be translated to l x w x z + y. • Write on the board, in words, some of the mathematical expressions they created, group by group. Ask other students to try to translate the expressions into mathematical symbols. • Complete "Writing Mathematical Expressions and Equations" worksheet (Resources). • Have students find a partner and play the "Make Fifteen" game to practice forming equations (Resources).	