



Ready, Set, Go Mission Possible



MIDDLE SCHOOL



Curriculum and Instruction
Division of Mathematics, Science, & Advanced Academic Programs

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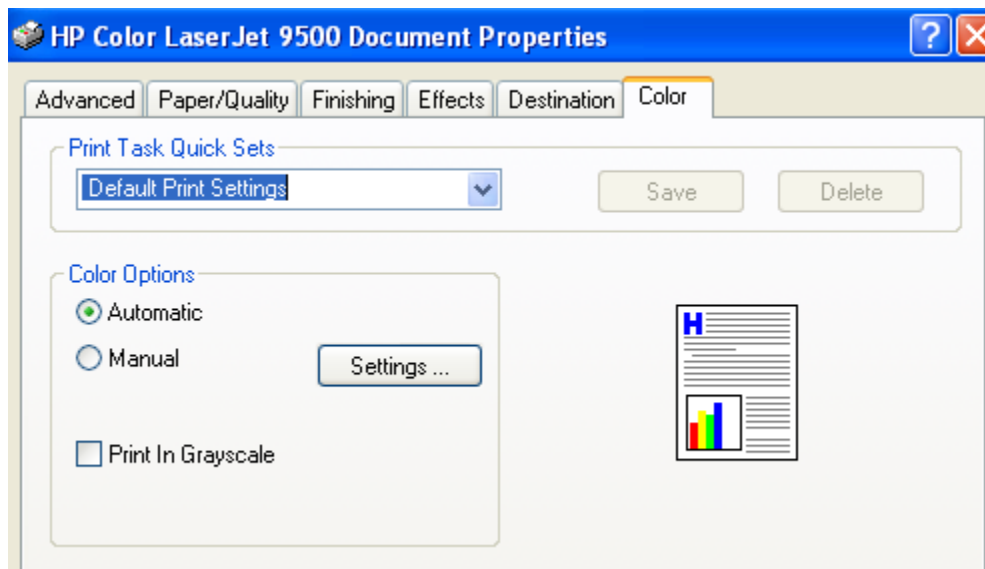
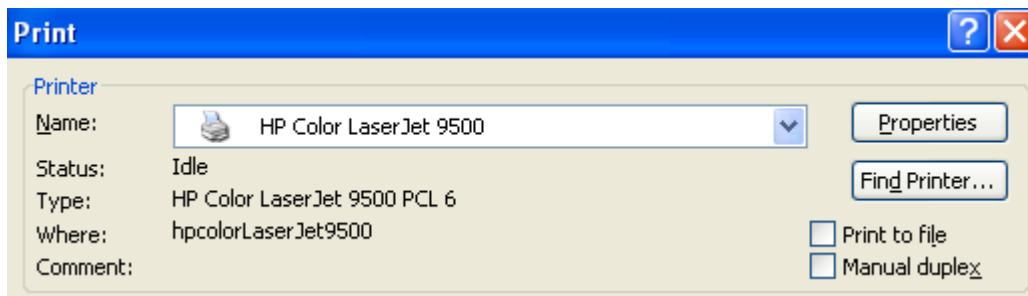
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Welcome to the Miami-Dade County Public School's Summer Fun packets. These fun activities are designed to help promote learning throughout the summer break. The activities are divided by grade levels and curriculum content – Social Studies, Science, Mathematics, and Reading/Language Arts. Educational web-links are also included with all packets. Please be sure to supervise your child while they are using the internet.

In addition to the fun packets, it is strongly recommended that you encourage you child to continue to read at least 30 minutes each day. Support for reading includes: Barnes & Nobles' *Summer Reading* <http://bn.com/summerreading> and Miami-Dade Public Library's *Wild About Reading Summer Reading Adventure* <http://www.mdpls.org>. In addition, *Ticket to Read* is available through the Student Portal: <http://www.dadeschools.net/students/students.htm>.

In an attempt to conserve paper and ink, if you wish to print these activities, they are combined using a little space as possible and no color except for the links on this page and this note. If you wish to avoid printing in color, please select "Print in grayscale" on your printer's properties/color tab located on the "Print" screen. See the figures below.



TITLE: Discovering Pi

DESCRIPTION:

The number π , defined as the ratio of the circumference of a circle to its diameter, has been an object of curiosity and study to mathematicians for thousands of years.

Nobody knows who the person was that first defined π , or that first estimated it. As long as people have built permanent structures or measured things, there has likely been some awareness of the number. There is evidence that approximations to π were used by the ancient Mesopotamians at the beginning of recorded history. In early written fragments from the ancient Egyptians and Babylonians, we find accounts of measuring circles.

The early approximations were doubtlessly discovered simply by measurement – rough estimates for π can be made using as little as a rope and a large circular object. Although not very accurate, the ancient Babylonian value of $25/8$ and Egyptian value of $256/81$ were good enough for most architectural purposes.

In today's classroom "math talk", we say that pi is approximately 3.14.

Activity:

- Gather the following materials:
- Ten or more circular objects of different sizes (jar lids, cake boards, tin cans, etc.)
- Measuring tools (tape measure, rulers, meter sticks, etc.)
- Calculator

Create a table to record your measurements like the one below:

TABLE 1

Circle	Circumference (C)	Diameter (D)	C + D	C – D	C x D	C / D
1						
2						
...

Optional: Use a spreadsheet to create and print your table.

- Measure all the circular objects and round your answers to the nearest thousandths.
- Record your data in the table and seriate them by size.

After recording all the measurements and calculations in the table, think about the following:

- What happens to the quantities in each of the columns?
- How are the first three columns different from the last?
- What is the mean for the last column (C/D)? Is the value close to Pi?

Optional: Watch the video "The Story of Pi" from Project Mathematics by Tom Apostol from CalTech. It can be found by doing a Google search.

TABLE 2

Bicycle Wheels

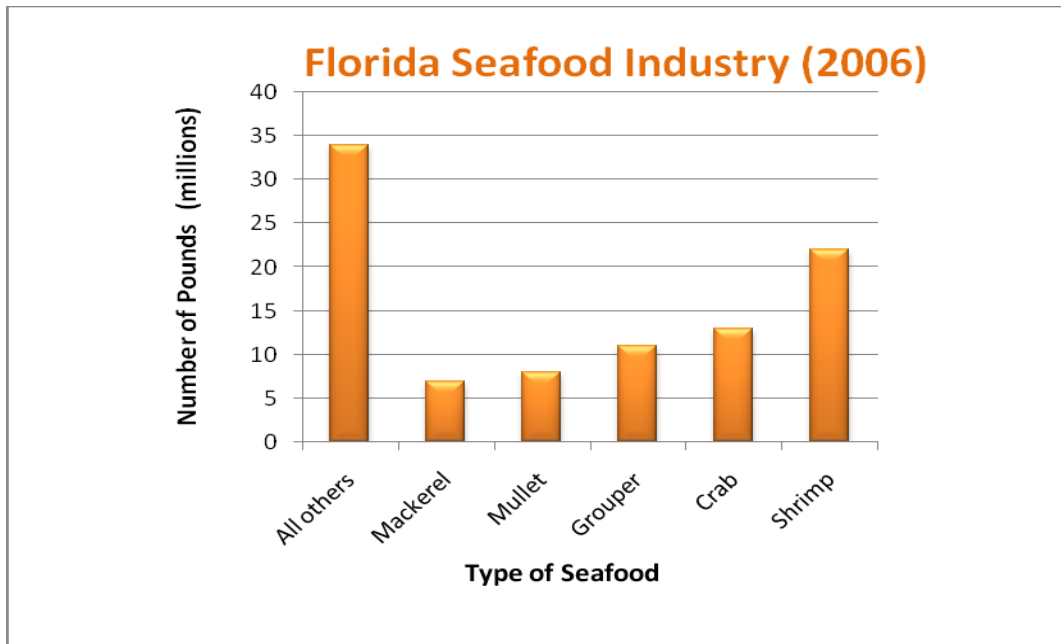
Radius (inches)	Circumference
5	
10	
15	
20	
25	
30	
35	

Grade Level	Body of Knowledge Standard(s)	Your Mission
Grade 6	<p>Geometry MA.6.G.4.1: Understand the concept of Pi, know common estimates of Pi (3.14; 22/7) and use these values to estimate and calculate the circumference and the area of circles.</p>	<ul style="list-style-type: none"> • Complete Table 1 for ten circles. • Determine the circumference of a bicycle wheel with a radius of 10 inches.
Grade 7	<p>Geometry MA.7.G.4.1: Determine how changes in dimensions affect the perimeter, area, and volume of common geometric figures, and apply these relationships to solve problems.</p>	<ul style="list-style-type: none"> • Determine the effects on the circumference of a bicycle wheel if the radius is doubled. • Explain your answer.
Grade 8	<p>Geometry MA.8.A.1.1: Create and interpret tables, graphs, and models to represent, analyze, and solve problems related to linear equations, including analysis of domain, range, and the difference between discrete and continuous data.</p>	<ul style="list-style-type: none"> • Complete Table 2, • Graph it, • Determine if the relationship is linear, • If so, write an equation, and specify the domain and range of the relationship.

TITLE: Florida's Seafood Industry

DESCRIPTION:

Florida has 1200 miles of coastline, so it's not surprising that fishing is one of the state's most important businesses. Florida fishermen catch more than 90% of the pink shrimp, spiny lobster, and other seafood's sold in the United States. The graph below gives data on the amount of seafood harvested in Florida in 2006.



Grade Level	Body of Knowledge Standard(s)	Your Mission
Grade 6	Algebra MA.6.A.5.3: Estimate the results of computations with fractions, decimals, and percents, and judge the reasonableness of the results.	<ul style="list-style-type: none"> Find the total amount of seafood harvested in the state. Estimate the percent of the 2006 harvest that was shrimp. Explain.
Grade 7	Algebra MA.7.A.1.2: Solve percent problems, including problems involving discounts, simple interest, taxes, tips, and percents of increase or decrease.	<ul style="list-style-type: none"> In 2006, about 0.6% of all the seafood harvested in the state was swordfish. How many pounds of swordfish were harvested? The amount of grouper harvested in 2006 was a 25% decrease from the amount harvested in 2004. How many pounds of grouper were harvested in 2004?

Grade Level	Body of Knowledge Standard(s)	Your Mission
Grade 8	<p>Algebra MA.8.A.6.4: Perform operations on real numbers (including integer exponents, radicals, percents, scientific notation, absolute value, rational numbers, and irrational numbers) using multi-step and real world problems.</p>	<ul style="list-style-type: none"> • Total sales in 2006 from farm-raised clams and oysters were \$10.7 million. This was about 14% of the state's total revenue from farm-raised fish aquatic plants. What was the total revenue from farm-raised fish and aquatic plants? • In 2005, 350 million clams were cultivated in Florida. In 2006, 500 million clams were cultivated in the state. What was the percent increase to the nearest percent?

TITLE: South Beach Chili Cook-off

DESCRIPTION:

Each year at the South Beach Food Festival, there is a chili cook-off contest. The South Beach Chili Cook-off is Miami's chili championship. In 2008, 25 cooks competed for the title and a chance to go on the Food Network Challenge.

Ingredients (Makes one gallon of chili)	
Ingredients	Price
2 cans tomatoes	\$1.45 per can
5lb ground beef	\$4.50 per pound
2 onions	\$0.75 each
1 packet of spices	\$2.50 per packet

Grade Level	Body of Knowledge Standard(s)	Your Mission
Grade 6	Algebra MA.6.A.3.2: Write and evaluate mathematical expressions that correspond to given situations.	<ul style="list-style-type: none"> Mildred uses the ingredients in the table to make chili for the cook-off. What is the cost of the ingredients needed to make one gallon of chili? The South Beach Chili Cook-off has an entry fee of \$25. The total cost of entering is the entry fee plus the cost of the chili ingredients. Write an equation that gives Mildred's total cost c, assuming she makes g gallons of chili.
Grade 7	Algebra MA.7.A.3.3: Formulate and use different strategies to solve one-step and two-step linear equations, including equations with rational coefficients.	<ul style="list-style-type: none"> The South Beach Chili Cook-off has an entry fee of \$25. The total cost of entering is the entry fee plus the cost of the chili ingredients. Write an equation that gives Mildred's total cost c, assuming she makes g gallons of chili. Solve the equation for g.
Grade 8	Algebra MA.8.A.4.2: Solve and graph one- and two-step inequalities in one variable.	<ul style="list-style-type: none"> Mildred's total cost for entering the cook-off is \$172. How many gallons of chili does she make? Tickets to the cook-off costs

Grade Level	Body of Knowledge Standard(s)	Your Mission
		<p>\$10 for adults and \$4 for children. One adult brings a group of children to the cook-off and uses two \$20 to buy the tickets. She receives some money back in change. Write and solve an inequality to find out the maximum number of children that could be in the group. Explain your answer.</p>

TITLE: Next Generation Spacecraft – Orion

DESCRIPTION:

Exploration provides the foundation of our knowledge, technology, resources, and inspiration. It seeks answers to fundamental questions about our existence, responds to recent discoveries and puts in place revolutionary techniques and capabilities to inspire our nation, the world, and the next generation. Through NASA, we touch the unknown, we learn and we understand. As we take our first steps toward sustaining a human presence in the solar system, we can look forward to far-off visions of the past becoming realities of the future.

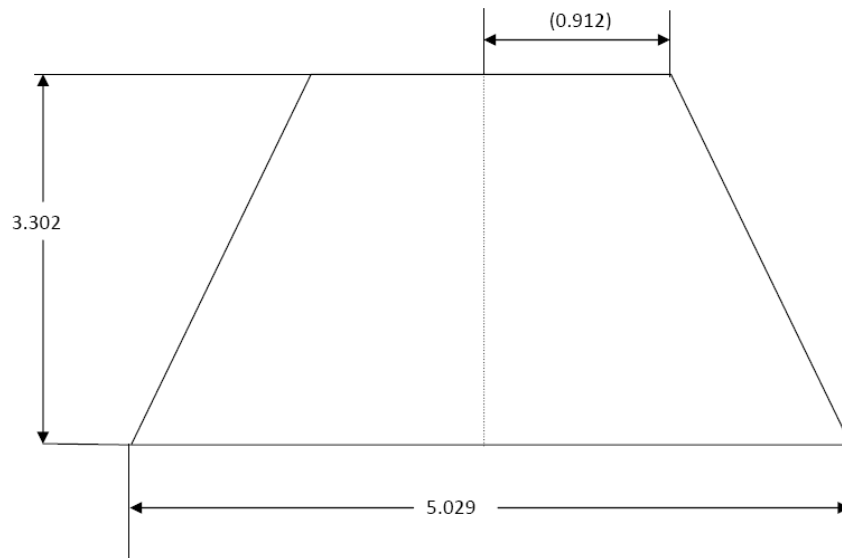
The Vision for Space Exploration includes returning the space shuttle safely to flight, completing the International Space Station, developing a new exploration vehicle and all the systems needed for embarking on extended missions to the Moon, Mars, and beyond. The Orion spacecraft will replace the space shuttle as NASA's spacecraft for human space exploration. The vehicle is designed to accommodate four to six astronauts traveling into space.



Vertical cross-section of the Orion crew module (NASA Concept)

This activity focuses on the Orion crew module, one of four functional modules of the Orion spacecraft. You will find the areas of the largest vertical and horizontal cross-sections. This information will provide you with a sense of the room within the crew module.

All measurements in meters unless otherwise noted.

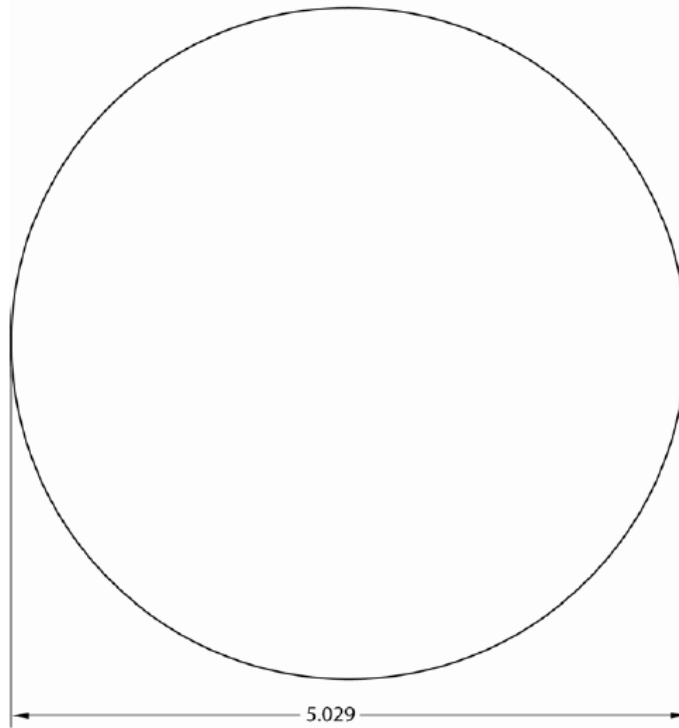


Largest vertical cross-section of the Orion crew module

TABLE 1
Vertical Cross-Section Area Data

Figure	Area Formula	Area Formula with Values	Area (m ²)

All measurements in meters unless otherwise noted.



Largest horizontal cross-section of the Orion crew module

TABLE 2
Horizontal Cross-Section Area Data

Figure	Area Formula	Area Formula with Values	Area (m ²)

Grade Level	Body of Knowledge Standard(s)	Your Mission
Grade 6	<p>Geometry MA.6.G.4.1: Understand the concept of Pi, know common estimates of Pi (3.14; 22/7) and use these values to estimate and calculate the circumference and the area of circles.</p>	<ul style="list-style-type: none"> • Complete Table 1 • Complete Table 2
Grade 7	<p>Algebra MA.7.A.1.2: Solve percent problems, including problems involving discounts, simple interest, taxes, tips, and percents of increase or decrease.</p>	<ul style="list-style-type: none"> • Complete Table 1 • Complete Table 2 • If the actual largest vertical cross-sectional area of the crew module is 11.665 m^2, how far off was your estimate? Express your answer in terms of a percent. Please round your answer to the nearest percent.
Grade 8	<p>Geometry MA.8.G.2.1: Use similar triangles to solve problems that include height and distances.</p>	<ul style="list-style-type: none"> • Complete Table 1 • Complete Table 2 • Find the area, in square meters (m^2), for the largest horizontal cross-section. Show how you would decompose, or break the figure into smaller parts, to estimate the total horizontal area. You may use a calculator to evaluate the formulas. Record your information in the table provided (Table 2). Round your answer to three decimal places.

TITLE: The Florida Marlins

DESCRIPTION:

In 1993, The Florida Marlin became the first Major League Baseball team to be based in Miami. They quickly became one of the National League’s top teams, winning the World Series in 1997 and 2003. The table shows statistics for several players on the 2007 Florida Marlins team.

Marlin 2007 Season Statistics		
Player	Runs Scored	Home Runs
Reggie Abercrombie	16	2
Alfredo Amezaga	46	2
Aaron Boone	27	5
Joe Borchard	20	4
Jeremy Hermida	54	18
Hanley Ramirez	125	29
Cady Ross	35	12
Matt Treanor	16	4
Jason Wood	11	3

Grade Level	Body of Knowledge Standard(s)	Your Mission
Grade 6	<p>Statistics MA.6.S.6.2: Select and analyze the measures of central tendency or variability to represent, describe, analyze, and/or summarize a data set for the purposes of answering questions appropriately.</p>	<ul style="list-style-type: none"> Choose a measure of central tendency to describe the typical number of runs scored. Justify your choice. Make a scatter plot of the data.
Grade 7	<p>Statistics MA.7.S.6.2: Construct and analyze histograms, stem-and-leaf plots, and circle graphs.</p>	<ul style="list-style-type: none"> Choose a measure of central tendency to describe the typical number of runs scored. Justify your choice. Choose a way to display the home-run data. Make the graph and explain why you chose this type of graph.
Grade 8	<p>Statistics MA.8.S.3.2: Determine and describe how changes in data values impact measures of central tendency.</p>	<ul style="list-style-type: none"> Make a scatter plot of the data. Describe any correlation you see in your scatter plot Suppose a player on the 2007 team who is not listed in the table scored 91 runs. Use your scatter plot to predict the number of home runs this player might hit. How does including the 10th player’ statistics affect the median number of runs scored by the Florida Marlins in 2007.

TITLE: Adventure Island

DESCRIPTION:

Adventure Island® is the perfect place to cool down on a hot summer day. With 30 acres of water rides, the park is one of Tampa’s top destinations for both locals and tourists. Whahoo Run® is one of the park’s raft rides. The table shows the distance the rafts travel in seconds.

Wahoo Run

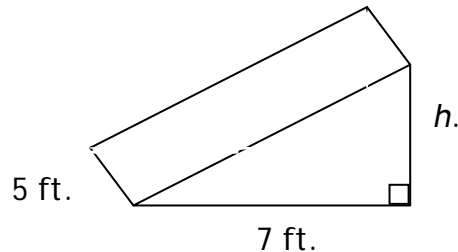
Raft Data	
Time (s)	Distance (ft)
1	15
2	30
3	45
4	60

Grade Level	Body of Knowledge Standard(s)	Your Mission
Grade 6	Algebra MA.6.A.3.1: Write and evaluate mathematical expressions that correspond to given situations.	<ul style="list-style-type: none"> Write an expression that gives the distance a raft travels in s seconds. Find the distance a raft travels in 7 seconds. Explain how you found the distance Wahoo Run’s corkscrew tunnel is 600 ft long. Write and solve an equation to find out how long it takes a raft to travel through the tunnel.
Grade 7	Algebra MA.7.A.3.2: Add, subtract, multiply, and divide integers, fractions, and terminating decimals, and perform exponential operations with rational bases and whole number exponents including solving problems in everyday contexts.	<ul style="list-style-type: none"> Splash Attack® features a huge bucket that fills with water and empties on guests every 7 minutes. The bucket holds 1×10^3 gallons of water. A park visitor claims that the bucket pours more than 10,000 gallons of water every hour. Do you agree or disagree? Why?
Grade 8	Algebra MA.8.A.6.1: Use exponents and scientific notation to write large and small numbers and vice versa and to solve problems.	<ul style="list-style-type: none"> IN 2007, Adventure Island was one of the top water parks in the world and had the highest attendance. Simplify the expression $20^2 + 500(10^3 + 2^8) - 13,400$ to find the number of people that visited in 2007.

TITLE: Skateboarding

DESCRIPTION:

Skateboarding ramps include angled boxes, lo-banks, quarterpipes, micro halfpipes, and wedges. Kits for building skateboards can include isometric drawings of sides and rear views. Carlos built a skateboarding ramp in the shape of a *wedge* (a triangular prism). He plans to paint all surfaces of the ramp.



Skateboarding ramp (*wedge*)

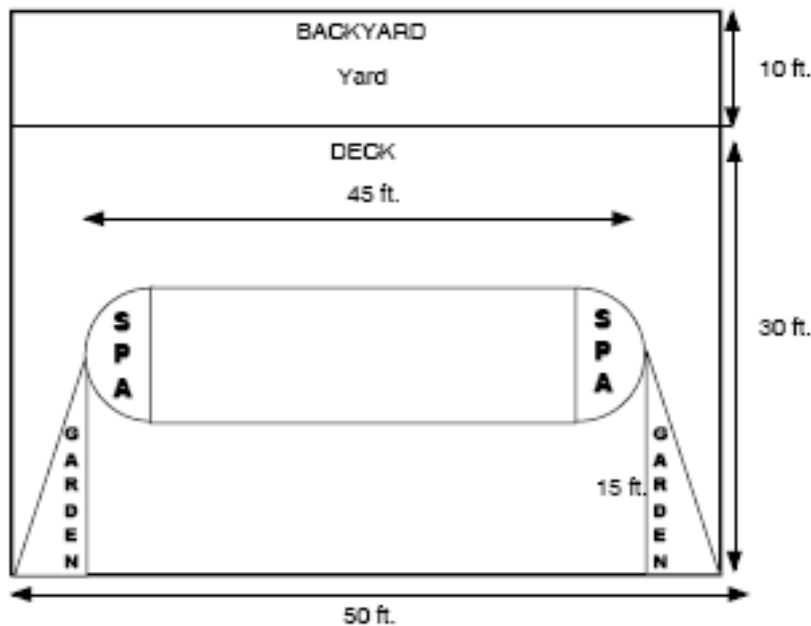
Grade Level	Body of Knowledge Standard(s)	Your Mission
Grade 6	Geometry MA.6.G.4.3: Determine a missing dimension of a plane figure or prism given its area or volume and some of the dimensions, or determine the area or volume given the dimensions.	<ul style="list-style-type: none"> Determine the height h of the skateboarding ramp if the volume is 52.5 ft^3.
Grade 7	Geometry MA.7.G.2.1: Justify and apply formulas for surface area and volume of pyramids, prisms, cylinders, and cones.	<ul style="list-style-type: none"> Determine the surface area of the skateboarding ramp.
Grade 8	Geometry MA.8.G.2.4: Validate and apply Pythagorean Theorem to find distances in real world situations or between points in the coordinate plane.	<ul style="list-style-type: none"> Determine the distance from the top to the bottom of the slanted surface of the skateboarding ramp.

TITLE: The Big Splash!

DESCRIPTION:

Mr. Sampson has built a dream pool for his family; it is in the center of the deck. He has a pool with 2 semicircle spas in his backyard. The deck that surrounds the pool and spas also has 2 identical right triangle gardens on either side. Mr. Sampson forgot some of the measurements of his creation. He needs help! He remembers that his son Mike likes to swim the width, which is 15 ft. Susan, his wife, enjoys swimming the length of the pool which is twice as long as the width (not including the two spas on the ends.) Each garden extends from the widest point of the spa to the edge of the deck. The dimensions that Mr. Sampson remembers are on the diagram. Please help Mr. Sampson.

* Clue - First calculate the areas of each individual section of the yard!



Grade Level	Body of Knowledge Standard(s)	Your Mission
Grade 6	<p>Geometry MA.6.G.4.3 Find the perimeters and areas of composite two-dimensional figures, including non-rectangular figures (such as semicircles) using various strategies.</p>	<p>Determine</p> <ol style="list-style-type: none"> 1) What is the total area of the pool and 2 spas? 2) What is the total area of the deck, gardens, pool, and 2 spas? 3) What is the total area of the pool and deck only - excluding the spas and gardens? 4) What is the total area of the deck and garden excluding the pool and spas? <p><i>Show all work and formulas used.</i></p>

Grade Level	Body of Knowledge Standard(s)	Your Mission
Grade 7	<p>Geometry MA.7.G.2.2 Use formulas to find surface areas and volume of three-dimensional composite shapes.</p>	<p>Mr. Sampson wants to put in a playground in the remainder of the backyard. He wants to buy:</p> <ul style="list-style-type: none"> a. Slide - covers 100 sq. ft. b. Sand box - covers 25 sq. ft. c. Swing set - covers 100 sq. ft. d. Monkey bars - 60 sq. ft. e. Jungle gym - 225 sq. ft. <p>How many things can Mr. Sampson fit in his yard? Justify your answer by writing to Mr. Sampson and explain which items he can fit in his back yard and why. (Remember he misplaces things so please draw a picture and write an explanation to help him. All items must be at least 3 feet from each other, and you must have at least 4 playground items in the backyard.)</p> <p style="text-align: center;"><i>Show all work and formulas used.</i></p>
Grade 8	<p>Geometry MA.8.G.5.1 Compare, contrast, and convert units of measure between different measurement systems (US customary or metric (SI) and dimensions including temperature, area, volume, and derived units to solve problems.</p>	<p>Complete the 7th Grade Task and figure out the perimeter of the pool and spas in both feet and <u>meters</u>.</p> <p>How much fencing would Mr. Sampson need to enclose his entire yard? (in both feet and <u>meters</u>)</p> <p>How much water would be needed to fill the spas that are 3 feet deep and the pool that is 5 feet deep? Explain how you got your answer.</p> <p>Clue: 7.5 gallons of water per cubic foot</p> <p style="text-align: center;"><i>Show all work and formulas used.</i></p>

INTERNET RESOURCES

The following mathematics titles are weblinks for students and parents that include activities and/or multimedia resources.

Mathematics Web Sites	Description	URL
Allmath.com: Glossary	A site for online worksheets, games, references, dictionaries, and other math related resources.	http://www.allmath.com/
The Ancients - Mathematicians of the African Diaspora	This site gives the history of mathematics in Africa south of the Sahara.	http://www.math.buffalo.edu/mad/Ancient-Africa/index.html
Aplusmath.com	This web site was developed to help students improve their math skills interactively	http://www.aplusmath.com/
Atomic Learning	A web-based software training for more than 100 applications students and educators use everyday.	http://www.atomiclearning.com/
Coolmath.com - An amusement park of mathematics... and more!	A site filled with math lessons, games, problems, and other mathematics resources.	http://www.coolmath.com/
FCAT Explorer	FLDOE online resource for FCAT math and reading.	http://www.fcatexplorer.com/
Free Worksheets	Free worksheets for K-12 education.	http://www.freeworksheets.com/
Figure This! Math Challenges for Families	A site to help families enjoy mathematics outside school through a series of fun and engaging, high-quality challenges.	http://www.figurethis.org/index.html
Math Counts	A National middle school math competition.	http://206.152.229.6/
Mathematics Glossary - Middle Years	A site with definitions that are designed to be meaningful to middle level mathematics teachers.	http://mathcentral.uregina.ca/RR/glossary/middle/glossaryab.html
MathDrill	Math problems are organized into 86 levels (and increasing), ranging from simple ordering of numbers to addition and subtraction fractions, time, algebra and geometry,	http://www.mathdrill.com/
Math in Daily Life	The site explores how math can help us in our daily lives.	http://www.learner.org/exhibits/dailymath/
Math Mania	An Amazing Mathematical Object Factory produces lists of mathematical objects in response to users' input.	http://theory.cs.uvic.ca/~cos/amof/
Math N Stuff	A site for online worksheets, games, references, dictionaries, and other math related resources.	http://www.mathnstuff.com/
Math Stories	The goal of this math website is to help elementary school (Grade 1st through 6th) children boost their math problem solving and critical-thinking skills.	http://www.mathstories.com/
Math Forum Home Page	Is a leading online resource for improving math learning, teaching, and communication since 1992.	http://mathforum.org/

Mathematics Web Sites	Description	URL
National Library of Virtual Manipulates	The National Library of Virtual Manipulatives (NLVM) is an NSF supported project that began in 1999 to develop a library of uniquely interactive, web-based virtual manipulatives or concept tutorials, mostly in the form of Java applets, for mathematics instruction (K-12 emphasis).	http://nlvm.usu.edu/en/nav/index.html
NRICH	A site filled with math lessons, games, problems, and cool resources.	http://nrich.maths.org/public/
Riverdeep	The District's free online interactive math resource for students.	http://riverdeep.dadeschools.net/lms
TI Calculator Link	Texas Instrument's graphing calculator resources.	http://education.ti.com/educationportal/sites/US/homePage/index.html

Federal and State Laws

The School Board of Miami-Dade County, Florida adheres to a policy of nondiscrimination in employment and educational programs/activities and strives affirmatively to provide equal opportunity for all as required by law:

Title VI of the Civil Rights Act of 1964 - prohibits discrimination on the basis of race, color, religion, or national origin.

Title VII of the Civil Rights Act of 1964, as amended - prohibits discrimination in employment on the basis of race, color, religion, gender, or national origin.

Title IX of the Educational Amendments of 1972 - prohibits discrimination on the basis of gender.

Age Discrimination in Employment Act of 1967 (ADEA), as amended - prohibits discrimination on the basis of age with respect to individuals who are at least 40.

The Equal Pay Act of 1963, as amended - prohibits gender discrimination in payment of wages to women and men performing substantially equal work in the same establishment.

Section 504 of the Rehabilitation Act of 1973 - prohibits discrimination against the disabled.

Americans with Disabilities Act of 1990 (ADA) - prohibits discrimination against individuals with disabilities in employment, public service, public accommodations and telecommunications.

The Family and Medical Leave Act of 1993 (FMLA) - requires covered employers to provide up to 12 weeks of unpaid, job-protected leave to "eligible" employees for certain family and medical reasons.

The Pregnancy Discrimination Act of 1978 - prohibits discrimination in employment on the basis of pregnancy, childbirth, or related medical conditions.

Florida Educational Equity Act (FEEA) - prohibits discrimination on the basis of race, gender, national origin, marital status, or handicap against a student or employee.

Florida Civil Rights Act of 1992 - secures for all individuals within the state freedom from discrimination because of race, color, religion, sex, national origin, age, handicap, or marital status.

Veterans are provided re-employment rights in accordance with P.L. 93-508 (Federal Law) and Section 295.07 (Florida Statutes), which stipulates categorical preferences for employment.

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